

TOOLS

CATALOGUE
No 17

THE L. S. STARBETT CO.
ATHOL, MASS. U.S.A.
NEW YORK CHICAGO

WITH SUPPLEMENT

Please destroy old numbers and order only from this Catalogue, No. 17.

To Save Time

Be careful to give with every order the **Tool Number** and **Size** of every article wanted. This is important, as negligence in this respect is liable to cause a delay in the execution of an order, until the necessary information can be obtained. If the number is correctly given no other description is necessary. It is easier to write, "Send 12, No. 303, 6 in.," than "Send 12 Spring-tempered Rules No. 4 graduation with graduated end, 6 in.," and it means the same.

Special Orders

We should be glad to accommodate customers wishing special styles or sizes of tools made for them, but cannot do so without causing so much of an interruption to regular work as to make the cost appear unreasonable; therefore, we prefer not to take an order for anything not represented in this catalogue.

Electrotypes

Of any tool we make will be sent to dealers on application without charge.

L. S. STARRETT 1880

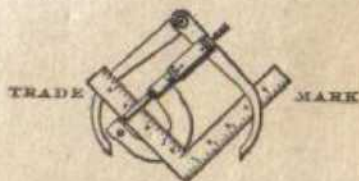
THE L. S. STARRETT CO. 1900

CATALOGUE No. 17

of the

❧ FINE ❧

MECHANICAL TOOLS



Manufactured by

The L. S. Starrett Company

Athol, Massachusetts

UNITED STATES

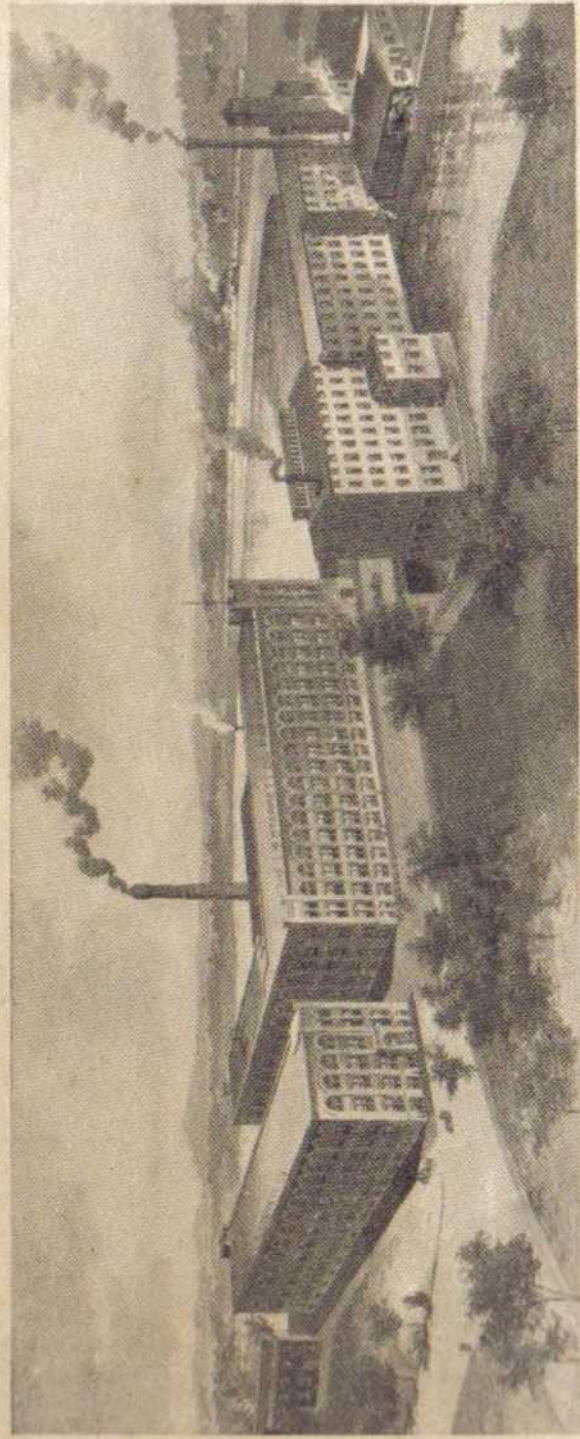
Cable Address, Starrett, Athol

Leiber's Code Used

NEW YORK STORE
123 Liberty Street

CHICAGO STORE
15 South Canal Street

PRESS OF SPRINGFIELD PRINTING AND BINDING COMPANY, SPRINGFIELD, MASS.



THE LARGEST PLANT IN THE WORLD DEVOTED EXCLUSIVELY TO THE
MANUFACTURE OF SMALL TOOLS FOR MECHANICS.
OVER THREE ACRES OF FLOOR SPACE.

Important !

EVERY Tool listed in this catalogue is **warranted accurate and satisfactory.**

Some people stamp their names on our tools, causing them to spring, and then write us that they are defective. Stamping the name on them is the cause of their being "out." We cannot replace or exchange any tools on which a name has been stamped.

The prices on tools in this catalogue are **net.**

Mechanics are requested to order our tools through hardware and tool dealers, but in places in the United States and Canada where the hardware trade do not sell our goods, we will send them, carriage prepaid, upon receipt of list prices.

When goods are ordered to be sent by express C. O. D., 20 per cent of the amount must accompany the order, and the express charge for return of money will be added. Cash with order will save this extra expense.

In ordering, do not fail to give the **size and number in catalogue** of each tool wanted.

We sell at a reasonable trade discount, on 30 days' time, to responsible hardware dealers.

Dealers without adequate commercial ratings must send satisfactory references before goods will be shipped, except for cash with order.

We do not pay carriage in any case to dealers.

All goods at purchaser's risk after shipment.

In ordering, say with each order how the goods are to be shipped, whether by freight, express, or mail.

In the absence of shipping instructions we will ship by what we consider the best way, cheapness, quickness, and safety being considered; and cannot be held responsible for transportation charges or delay in transit.

Goods ordered sent by mail are at the purchaser's risk.

We assume no responsibility for loss or delay when goods are shipped according to instructions, but should miscarriage or loss occur we will do our best, in the interest of the purchaser, to have the lost goods found, or proper restitution made by the transportation company at fault.

All business communications should be addressed to the Company, not to individuals.

Steel Rules



In 1882, L. S. Starrett began the manufacture of light, thin, spring-tempered steel rules. The advantages of these rules over the ordinary thick, soft rules were so apparent that they at once became universally popular among mechanics. They still lead in this class of fine tools. Our twenty years' experience in tempered rule making, with continually improving processes and products, has resulted in new graduating machines from Mr. Starrett's own designs, and new departments equipped with every perfected appliance needed for the manufacture of accurate scales. The popularity of our spring-tempered rules is attested not only by the demand for them among mechanics, but also by the fact that other manufacturers have been forced to imitate them and to adopt, as near as they are able, our improved methods.

Attention is invited to the variety of rules we make; Spring-Tempered, both light and heavy, Flexible, Semi-Flexible and Narrow, Desk Rules and Shrink Rules, in a number of different English graduations, and Spring-Tempered and Flexible Rules graduated in the Metric System, as well as combining both the Metric and the English measure. Realizing the marked growth of the metric idea in this country, as well as its wide use abroad, we have made preparations to meet the growing demand for metric rules, and offer the largest line in respect to lengths and thicknesses made in the United States.

Our rules are made to agree with accurate standards furnished by the United States government.

Steel Rules

English Measure

Graduations

Our Rules are divided into parts of inches as follows:—

No. 1 Graduation

1st corner	10, 20, 50, 100
2d "	12, 24, 48
3d "	16, 32, 64
4th "	14, 28

No. 2 Graduation

1st corner	10, 20, 50, 100
2d "	12, 24, 48
3d "	16, 32, 64
4th "	8

No. 4 Graduation

1st corner	64
2d "	32
3d "	16
4th "	8

No. 6 Graduation

1st corner	32
2d "	16
3d "	8
4th "	4

No. 7 Graduation

1st corner	64
2d "	32
3d "	16
4th "	8

No. 10 Graduation

1st corner	32
2d "	16

No. 11 Graduation

1st corner	64
2d "	32

No. 12 Graduation

1st corner	50
2d "	100

No. 13 Graduation

1st corner	8
2d "	16

No. 14 Graduation

1st corner	8
2d "	16

No. 15 Graduation

1st corner	10
2d "	20
3d "	50
4th "	100

No. 16 Graduation

1st corner	32
2d "	16
3d "	8
4th "	4

Spring-Tempered Rules



Thickness: $\frac{3}{32}$ in. or No. 18 gauge.

Approximate

widths: $\frac{1}{8}$ in. $\frac{1}{4}$ in. $\frac{3}{8}$ in. $\frac{1}{2}$ in. $\frac{3}{4}$ in. 1 in. $1\frac{1}{8}$ in. $1\frac{1}{4}$ in. $1\frac{1}{2}$ in. $1\frac{3}{4}$ in. $1\frac{7}{8}$ in.

Lengths: 1 " 2 " 3 " 4 " 6 " 9 " 12 " 18 " 24 " 36 " 48 "

Prices: \$0.15 .25 .35 .45 .65 1.00 1.25 2.00 2.50 5.00 7.00

No. 300 Spring-Tempered, No. 4 graduation.

No. 301 " No. 1 "

No. 302 " No. 2 "

No. 306 " No. 6 "

No. 307 " No. 7 "

No. 308 " No. 15 "

No. 309 " No. 16 "

Spring-Tempered Rules

With Graduated End



No. 303 has No. 4 graduations and is graduated in 32ds of an inch on opposite sides of one end.

No. 304 has No. 4 graduations, and is graduated in 32ds of an inch on one side and in 48ths on the other side of the same end.

Both numbers are of the same widths and thicknesses as corresponding lengths of No. 300 rules.

Nos. 303 and 304 are made in 2 in. to 24 in. lengths only, inclusive.

Prices: The same as for No. 300 rules.

Spring-Tempered Rules

With One Beveled Edge



Same widths and thicknesses as Rules No. 300.
Made in 1 in. to 24 in. lengths only, inclusive.

No. 400 Beveled, No. 4 graduation, with 64ths on beveled edge.
No. 407 " No. 7 " " 100ths " " "

PRICES: The same as for No. 300 rules.

Spring-Tempered Rules

With One Beveled Edge and Graduated End



Same widths and thicknesses as Rules No. 300.

No. 403 Beveled, No. 4 graduation, with 64ths on the beveled edge, and graduated in 32ds of an inch on opposite sides of one end.

No. 404 Beveled, No. 4 graduation, with 64ths on the beveled edge, and graduated in 32ds of an inch on one side, and to 48ths on the other side of the same end.

No. 403 and **404** are made in 2 in. to 24 in. lengths only, inclusive.

PRICES: The same as for No. 300 rules.

Heavy Spring-Tempered Rules



Thickness about $\frac{1}{16}$ inch.

Widths:	$\frac{1}{2}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	$1\frac{3}{4}$ in.	$1\frac{1}{2}$ in.	$1\frac{1}{2}$ in.
Lengths:	6 "	9 "	12 "	18 "	24 "	36 "	48 "
Prices:	\$0.65	1.00	1.25	2.00	2.50	5.00	7.00

No. 410 Heavy, Spring-Tempered, No. 4 graduation.

No. 417 " " " No. 7 "

Flexible Rules



These are very thin spring-tempered rules, nicely graduated on one side only. Those from 1 inch to 12 inches are $\frac{1}{8}$ inch wide, and will easily conform to a 2-inch circle. Those from 18 inches to 48 inches are $\frac{3}{8}$ inch wide, and are made from a trifle heavier stock.

Lengths:	1 in.	2 in.	3 in.	4 in.	6 in.	9 in.	12 in.	18 in.	24 in.	36 in.	48 in.
Prices:	\$0.15	.25	.35	.45	.65	1.00	1.25	2.00	2.50	5.00	7.00

No. 320 Flexible, No. 10 graduation. (32ds and 64ths.)

No. 321 " No. 11 " (64ths and 100ths.)

No. 322 " No. 12 " (50ths and 100ths.)

No. 323 " No. 13 " (8ths and 16ths.)

No. 324 " No. 14 " (8ths and 32ds.)

Semi-Flexible Rules



Made in 2 inch to 12 inch lengths only, inclusive.

These rules are about $\frac{1}{8}$ inch thick, heavier than the Flexible Rules and lighter than the Spring-Tempered Rules. They are of the same widths as the corresponding lengths of Spring-Tempered Rules.

Lengths:	2 in.	3 in.	4 in.	6 in.	9 in.	12 in.
Prices:	\$0.25	.35	.45	.65	1.00	1.25

No. 325 Semi-Flexible, No. 4 graduation, and graduated in 32ds of an inch on both sides of one end.

Narrow Rules



$\frac{1}{8}$ inch wide, No. 18 gauge, spring-tempered, graduated one corner each side whole length, either in 32ds and 64ths, 50ths and 100ths, or 64ths and 100ths.

Lengths:	4 in.	6 in.	9 in.	12 in.
Prices:	\$0.45	.65	1.00	1.25

No. 330	Narrow, No. 10 graduation.	(32ds and 64ths.)
No. 331	" No. 11 "	(64ths and 100ths.)
No. 332	" No. 12 "	(50ths and 100ths.)

Steel Shrink Rules

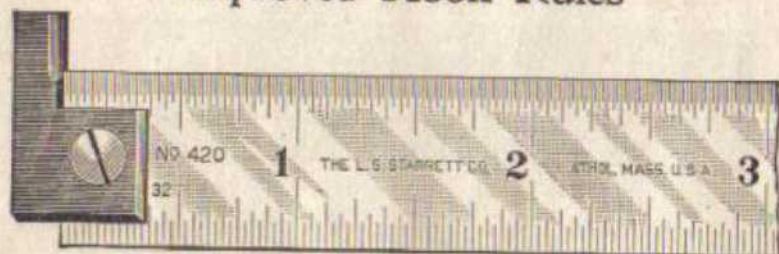
PRICES

12 inch.....	\$1.75	24 inch.....	\$3.50
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These rules are spring-tempered, except No. 372, and are of the same width and thickness as Spring-Tempered Standard Rules.

No. 370	Shrink, $\frac{1}{2}$ to foot, No. 4 graduation.	
No. 371	" " " No. 2 "	
No. 372	" " " Flexible, graduated in 32ds and 64ths.	
No. 373	Shrink and Standard, $\frac{1}{2}$ to foot, No. 4 graduation.	
No. 375	Brass Shrink, $\frac{1}{8}$ to foot, No. 4 graduation.	
No. 376	" " " " No. 2 "	
No. 377	Double Shrink, $\frac{1}{2}$ to foot, No. 4 "	
No. 378	" " " " No. 2 "	

Improved Hook Rules



Very convenient in taking measurements from round corners, through hubs of pulleys, setting inside calipers, etc. The 6 inch may be carried in the pocket. The hook can be quickly removed by turning eccentric stud one half round.

Lengths:	6 in.	9 in.	12 in.	18 in.	24 in.	36 in.
Prices:	\$1.00	1.40	1.75	2.50	3.00	5.75

No. 419 Our No. 303 Rule, No. 4 graduation, with hook and with end graduation.

No. 420 Our No. 300 Rule, No. 4 graduation, with hook.

No. 421 " No. 410 " No. 4 " " "

The hooks can be applied to our rules of other graduations when ordered. Prices same as above.

Narrow Hook Rules



These rules are designed for use in taking measurements through small holes where our regular hook rules cannot be used. They can also be used for setting inside calipers, etc. Measurements through holes as small as $\frac{1}{8}$ inch can be obtained.

The rules are graduated one side in 32ds and the other in 64ths of an inch.

No. 422 Our No. 330 Rule, with hook.

Lengths:	4 in.	6 in.	9 in.	12 in.
Prices:	\$0.70	.90	1.25	1.50

These hooks can be applied to our other narrow rules of different graduations. See our Rules Nos. 331 and 332, page 9.

Rules with Thumb Slide

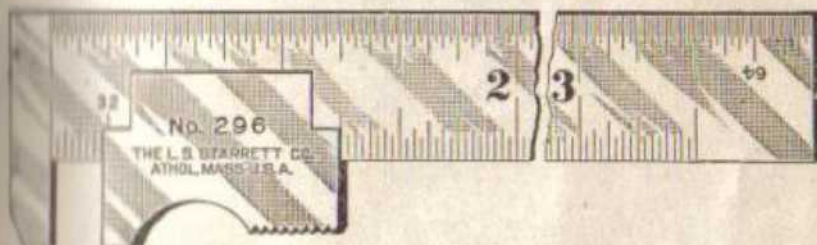


These are our regular spring tempered rules fitted with a thumb slide. They are useful in measuring against a shoulder, the width of flanges, collars, etc. The slide may be used on either edge of the rule, or removed and the rule used alone. The rules are 6 inches long, about $\frac{1}{2}$ inch wide and $\frac{1}{4}$ inch thick.

No. 290	6 inch.	No. 4 graduation.
No. 291	6 "	" 1 "
No. 292	6 "	" 2 "
No. 297	6 "	" 7 "

Price, each.....\$1.00

Slide Caliper Rules No. 296



These rules are of the same dimensions as our 4 inch, No. 11, square blades, with the addition of a jaw on the end. The graduations are No. 4, with the 16ths and 64ths on the front as shown and the 8ths and 16ths on the back. The thumb piece slides in a groove on the reverse side, as in No. 290 shown above. The jaws are $\frac{1}{4}$ inch deep. These tools are most convenient for measuring small rods, tubing, etc., and in many cases will be found a substitute for a more expensive Caliper Square.

Price, each.....\$1.25

No. 996M The above rule is furnished with graduations in millimeters and half millimeters at the same price.

Steel Rules

Metric



		PRICES
5 cm.	1.9685 inch.....	\$0.25
10 "	3.9370 ".....	.45
15 "	5.9055 ".....	.65
20 "	7.8740 ".....	.85
25 "	9.8425 ".....	1.05
30 "	11.8110 ".....	1.25
40 "	15.7480 ".....	1.65
50 "	19.6850 ".....	2.00
60 "	23.6220 ".....	4.00
80 "	31.4960 ".....	5.60
1 m.	39.3700 ".....	7.00

Spring-Tempered

Of same widths and thicknesses as Spring-Tempered Rules of English Measure.

Lengths and prices given above.

No. 340 Graduated three corners in millimeters, one corner in $\frac{1}{2}$ mm.

No. 341 From 5 to 15 cm., inclusive, graduated three corners in millimeters, one corner in $\frac{1}{2}$ mm. Above 15 cm., graduated in $\frac{1}{2}$ mm. on 5 cm. of one corner, the rest of that corner and the other corners in millimeters.

Flexible

Of same widths and thicknesses as Flexible Rules of English Measure. Graduated on one side only.

Lengths and prices as above.

No. 345 Graduated one edge in millimeters, the other in $\frac{1}{2}$ mm.

No. 346 From 5 to 15 cm., inclusive, graduated one corner in millimeters, the other corner in $\frac{1}{2}$ mm. Above 15 cm., graduated in $\frac{1}{2}$ mm. on 5 cm. of one corner, the rest of that corner and the other corner graduated in millimeters.

Narrow

Graduated on one edge of each side only, $\frac{1}{16}$ wide, No. 18 gauge.

Sizes 10, 15, 20, and 30 cm.

Prices as above.

No. 347 Graduated one side in millimeters, the other in $\frac{1}{2}$ mm.

Steel Rules

Metric and English

Same dimensions and prices as Metric Rules on preceding page.

Spring-Tempered

No. 350 Graduated one corner each in millimeters, $\frac{1}{8}$ mm., 32ds and 64ths, all sizes.

No. 351 First corner graduated in $\frac{1}{8}$ mm., second corner in 1 mm., third corner in $\frac{1}{4}$ in., fourth corner in $\frac{1}{8}$ in., up to and including 15 cm. Above 15 cm., 2 inches of third corner graduated in 64ths, the rest of that corner in 16ths. Two inches of fourth corner graduated in 100ths, the rest of that corner in 50ths.

Flexible

Graduated on one side only. Lengths and prices same as Metric Rules on preceding page.

No. 355 Graduated one edge in millimeters, the other in 64ths.

No. 356 Graduated one edge in $\frac{1}{8}$ millimeters, the other in 100ths, sizes up to 15 cm. Sizes above 15 cm. graduated one edge in $\frac{1}{8}$ millimeters, the other edge 2 in. in 100ths, balance in 50ths.

Narrow

Graduated on one edge of each side only, $\frac{1}{8}$ wide, No. 18 gauge. Sizes 10, 15, 20, and 30 cm. Prices same as for Metric Rules on preceding page.

No. 357 Graduated one edge in millimeters, the other in 64ths.

No. 358 Graduated one edge in millimeters, the other in 100ths.

Center Gauges



For use in grinding and setting screw cutting tools.

PRICES

No. 390	Not tempered, graduated one corner each in 32ds, 24ths, 20ths, and 14ths.....	\$0.25
No. 391	Spring-tempered.....	.35
No. 392	Whitworth, not tempered.....	.25
No. 393	Metric, not tempered.....	.25
No. 394	spring-tempered.....	.35

The angles are 60°, except in No. 395, in which they are 55°.

Spring-Steel Desk Rules

For Draughtsmen, Bookkeepers, Etc.



These rules are thin, light and handsome, of spring-tempered steel, about 1 inch wide and $\frac{1}{16}$ inch thick, nicely finished and nickel plated.

One edge is sharply beveled, so that ink will not stick to it. This prevents blotting the paper and smearing the fingers.

The thinness of the rule brings the working edge close to the paper, which is an advantage anyone will appreciate who has done hit-or-miss ruling with a common ruler, the edge of which stands up a quarter of an inch from the work. With Starrett's you draw the line just where you want it.

Made both plain and accurately graduated on one edge in 16ths of an inch.

PRICES

No. 365

12 inch, not graduated.....	\$0.50
15 " " ".....	.75
18 " " ".....	1.00

No. 366

12 inch, graduated.....	\$0.75
15 " " ".....	1.10
18 " " ".....	1.40

Draughtsmen's Scales, Patented



This scale has tilting studs, so placed that each of its four corners, with different graduations, will come in contact with the paper by its own gravity when resting on said studs, with the back edge raised at an angle of about 30° . The scales are graduated on each of their four corners in parts of inches as follows:—

No. 405	10ths, 40ths, 50ths, 100ths.
No. 405 A	8ths, 16ths, 32ds, 64ths.

PRICES.

Nos. 405 and 405 A

6 inch.....	\$1.00
12 "	1.50

No. 405 M

Graduated in the Metric System, one edge of each side in millimeters, the other edge in $\frac{1}{2}$ mm.

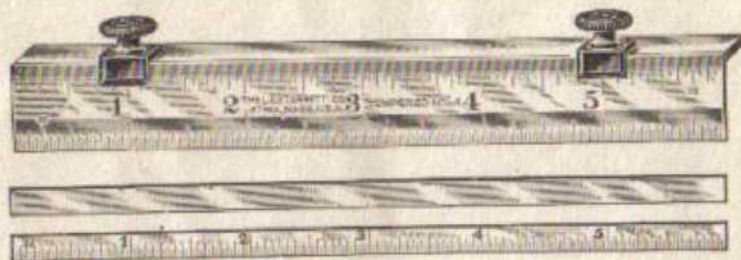
PRICES

15 cm.....	\$1.00
30 "	1.50

Prices for above rules of graduations different than listed, quoted on application.

Starrett Patent Key-Seat Rule

No. 105



The improved feature in this rule consists of a device for holding two straight edges in the form of a box square (or key-seat rule) securely together. One of said straight edges is a spring-tempered scale, with one edge beveled, graduated in 8ths, 16ths, 32ds, 64ths, the other a plain straight edge with two or three clamps (according to its length), which are operated by knurled eccentrics clamping corner and edge of straight edge and scale together; thus, not only allowing the scale to be used as such independently from the other part, but being in two straight pieces it admits of being made from spring-tempered stock and accurately ground, also of inserting, in place of the regular width rule, a narrow auxiliary one, adapting it for use on very small shafts, etc. This narrow auxiliary straight edge is either plain or graduated in 32ds and 64ths, and sent when ordered.

Sent without the auxiliary straight edges unless otherwise ordered.

PRICES

6	inch	.....	\$2.25
6	"	with auxiliary straight edge, plain.....	2.75
6	"	" " " " graduated.....	3.00
9	"	.....	3.00
9	"	with auxiliary straight edge, plain.....	3.75
9	"	" " " " graduated.....	4.25

Steel Straight Edges

Not graduated. Made in pairs when two are wanted of exactly the same width. The prices given are for *single* straight edges.

No. 380 Plain



PRICES

12 in. long, 1 in. wide, $\frac{1}{8}$ in. thick, \$1.20	24 in. long, 1½ in. wide, $\frac{1}{8}$ in. thick, \$2.40
18 " " 1½ " " $\frac{1}{8}$ " " 1.80	36 " " 2 " " $\frac{1}{8}$ " " 5.00
48 in. long, 2½ in. wide, $\frac{1}{4}$ in. thick, \$8.00	
60 " " 3 " " $\frac{1}{4}$ " " 12.00	
72 " " 3 " " $\frac{1}{4}$ " " 16.00	

No. 385 Beveled



PRICES

12 in. long, 1 in. wide, $\frac{1}{8}$ in. thick, \$1.50	24 in. long, 1½ in. wide, $\frac{1}{8}$ in. thick, \$3.50
18 " " 1½ " " $\frac{1}{8}$ " " 2.50	36 " " 2 " " $\frac{1}{8}$ " " 6.00
48 in. long, 2½ in. wide, $\frac{1}{4}$ in. thick, \$10.00.	

One edge only is beveled, and this to $\frac{1}{8}$ inch thick from $\frac{1}{4}$ to $\frac{3}{4}$ inch back.

Graduated Steel Straight Edges

No. 383 Not Beveled



Same widths and thicknesses as our No. 380. Graduated on one side only, one edge in 16ths and the other in 8ths of an inch.

PRICES

12 in.	\$1.80	24 in.	\$3.25
18 "	2.50	36 "	6.25
48 in.	\$10.00		

No. 387 Beveled



Same widths and thicknesses as our No. 385. Graduated on beveled edge only in 32ds of an inch.

PRICES.

12 in.	\$2.00	24 in.	\$4.25
18 "	3.00	36 "	7.25
48 in.	\$12.00		

Hardened Steel Straight Edges

No. 382



These straight edges are accurately ground and hardened on the edges, and are guaranteed to be correct.

PRICES

Length	Width	Approximate Thickness	Price
12	$\frac{1}{2}$	$\frac{1}{8}$	\$0.40
24	$\frac{1}{2}$	$\frac{1}{8}$	.45
24	$\frac{3}{4}$	$\frac{1}{8}$	.50
36	$\frac{3}{4}$	$\frac{1}{8}$	.60
54	1	$\frac{1}{8}$	1.00
72	1 $\frac{1}{8}$	$\frac{1}{8}$	1.25
102	1 $\frac{1}{2}$	$\frac{1}{8}$	2.00
126	2	$\frac{1}{8}$	2.75
174	2 $\frac{1}{2}$	$\frac{1}{8}$	3.50
204	2 $\frac{3}{4}$	$\frac{1}{8}$	4.50
264	3 $\frac{1}{2}$	$\frac{1}{8}$	6.50

Draughtsmen's Steel Straight Edges

Nickel Plated

These straight edges are made especially for draughtsmen's use. They are nickel plated with dull finish, and with a hole at one end.



No. 381 Not Beveled

Length	Width	Approximate Thickness	Price
12	1 1/8	5/16	\$1.00
15	1 1/8	5/16	1.50
18	1 1/8	5/16	1.75
24	1 1/8	5/16	2.00
30	1 1/8	5/16	2.50
36	1 1/8	5/16	3.25
42	1 1/8	5/16	4.25
48	2	5/16	5.00
54	2	5/16	6.50
60	2	5/16	7.50
72	2 1/8	5/16	9.50



No. 386 Beveled

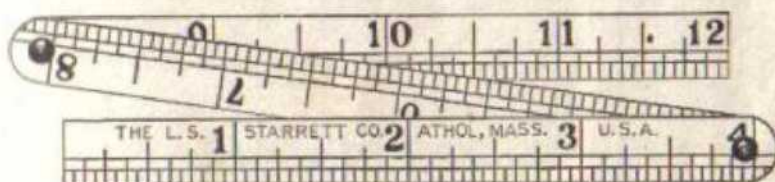
Same as No. 381 except one edge is beveled.

Length	Width	Approximate Thickness	Price
12	1 1/8	5/16	\$1.25
15	1 1/8	5/16	1.75
18	1 1/8	5/16	2.00
24	1 1/8	5/16	2.25
30	1 1/8	5/16	3.00
36	1 1/8	5/16	3.75
42	1 1/8	5/16	4.75
48	2	5/16	6.00
54	2	5/16	7.50
60	2	5/16	8.50
72	2 1/8	5/16	10.50

Folding Steel Pocket Rules

No. 450

Made of Best Quality Spring Tempered Steel



One foot long, $\frac{3}{8}$ inch wide, 4-inch joints, 3 fold.

PRICES

Per dozen	\$2.50
In metal bound leather cases.....	3.00
Nickel plated, extra.....	1.00

Two feet long, $\frac{3}{8}$ inch wide, 6-inch joints, 4 fold.

PRICES

Per dozen.....	\$4.50
In metal bound leather cases.....	6.00
Nickel plated, extra.....	1.50

Blacksmiths' Steel Rules

No. 460

Folding

Made of best quality spring tempered steel. Two feet long, $\frac{1}{2}$ inch wide, 12 inch joints, 2 fold. Cut shows full width. Graduated in 8ths of an inch on one side and 16ths on the other.

PRICES

Per dozen.....	\$4.80
Each.....	.40

No. 461

Folding, with Stop Joint

The same as No. 460, except that they have stop joints.

PRICES

Per dozen.....	\$6.00
Each.....	.50

Blacksmiths' Brass Rules

No. 462

Folding, with Stop Joint

Made of hard brass. Two feet long, $\frac{1}{2}$ inch wide, 12 inch joints, 2 fold. Graduated in 8ths of an inch on one side and 16ths on the other.

PRICES

Per dozen.....	\$4.80
Each.....	.40



No. 460



Steel Measuring Tapes

Where anything approaching correct measures of long lengths is required, nothing gives such close results as a steel tape, the expansion or contraction of one a hundred feet long being less than a quarter of an inch in a temperature variation of thirty degrees. All woven tapes will stretch or shrink, and cannot be depended upon. Where accurate measurements are necessary, one of our steel tapes should be used. They can be thoroughly relied upon for quality of material, workmanship and accuracy.

An important improvement we have made in steel tapes consists in placing at each foot figures smaller than the intermediate figures denoting inches or tenths of a foot.

This dissimilarity of figures materially lessens (in fact ought to entirely obviate) the liability to erroneous readings that frequently occurs through the uniformity of all figures in steel tapes of other makers.

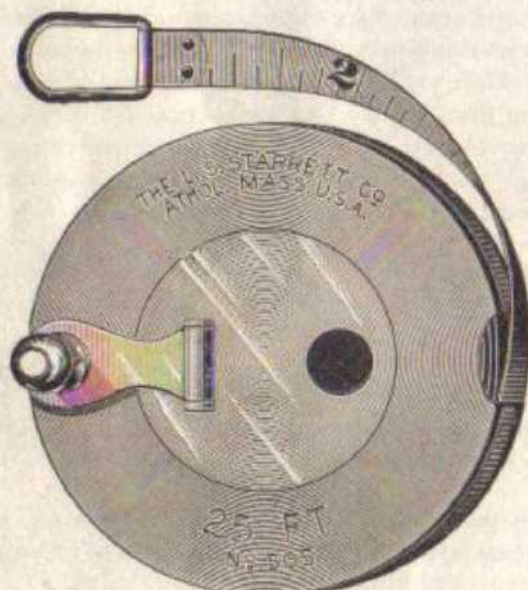
The smaller figures denoting feet also allow the graduation line under each to be plainly visible, instead of being obliterated by the usual larger figure.

Special attention is called to our push button handle opener as shown in the following pages. This does away with the use of the finger nail, or of the knife blade or screw driver after two or three nails have been broken in a vain attempt to open a refractory handle. A slight pressure on the push button, on the side opposite the handle, will instantly open it. This can be done with a thick glove on as well as with the bare hand.

It is hardly necessary to say that short twists or kinks should never be allowed to occur in steel tapes; also that they should be kept free from rust. They should be carefully wiped and dried after using. With proper care one of our tapes should last a lifetime.

Steel Measuring Tapes in Steel Cases

No. 505 and No. 506



These tapes are $\frac{1}{2}$ inch wide, graduated on one side in tenths or twelfths of a foot, in strong and well finished nickel plated steel cases, with folding flush winders. These are used principally by engineers and others where oil or grease would soil leather cases.

No. 505 are graduated in feet and twelfths of a foot, also in inches and eighths of an inch.

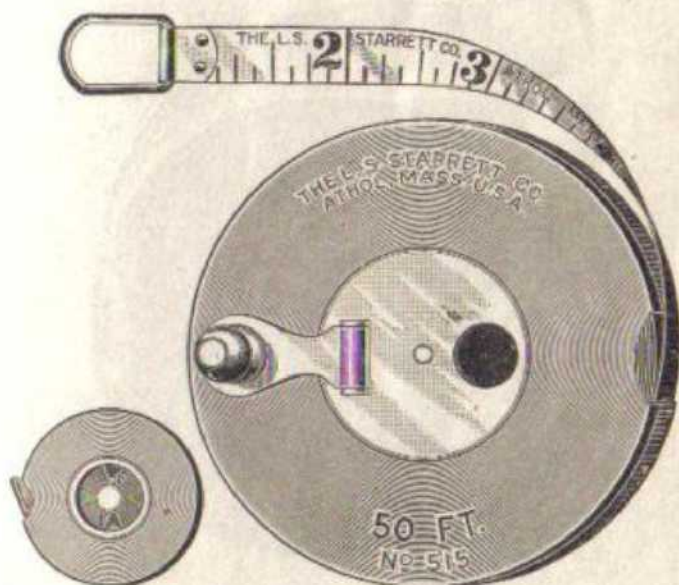
No. 506 are graduated in feet, tenths and hundredths of a foot. This style is especially adapted for surveyor's use.

PRICES NO. 505 AND NO. 506

25 feet, in case, $2\frac{1}{2}$ inch diameter, each.....	\$2.75
50 " " " $3\frac{1}{2}$ " " "	3.40
75 " " " $3\frac{3}{4}$ " " "	4.50
100 " " " $4\frac{1}{2}$ " " "	5.75

Steel Measuring Tapes in Steel Cases with Push Button

No. 515 and No. 516



These tapes are $\frac{3}{8}$ inch wide, in strong and well finished nickel plated steel cases, with flush handle and push button on opposite side, a slight pressure of which will instantly release the handle.

No. 515 are graduated in feet and twelfths of a foot, also in inches and eighths of an inch.

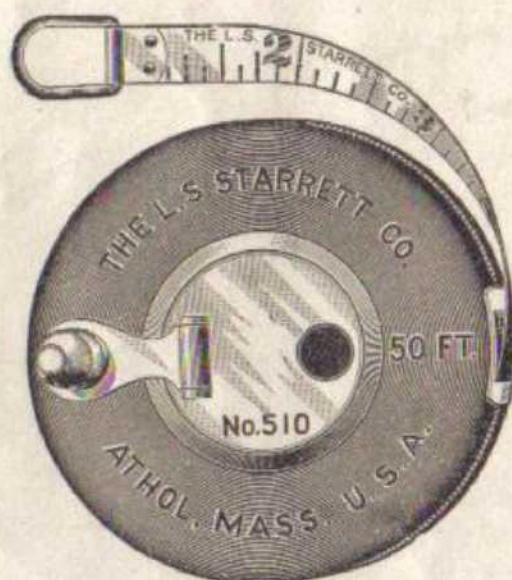
No. 516 are graduated in feet, tenths and hundredths of a foot. This style is especially adapted for surveyor's use.

PRICES No. 515 AND No. 516

25 feet, in case, $2\frac{1}{4}$ inch diameter, each.....	\$4.00
50 " " " $3\frac{1}{4}$ " " "	4.65
75 " " " $3\frac{3}{4}$ " " "	5.75
100 " " " $4\frac{1}{4}$ " " "	7.00

Steel Measuring Tapes in Leather Cases

No. 510 and No. 511



These tapes are $\frac{1}{2}$ inch wide, graduated on one side in tenths or twelfths of a foot, in hard leather cases, flush handle, trimmings nickel plated.

No. 510 are graduated in feet and twelfths of a foot, also in inches and eighths of an inch.

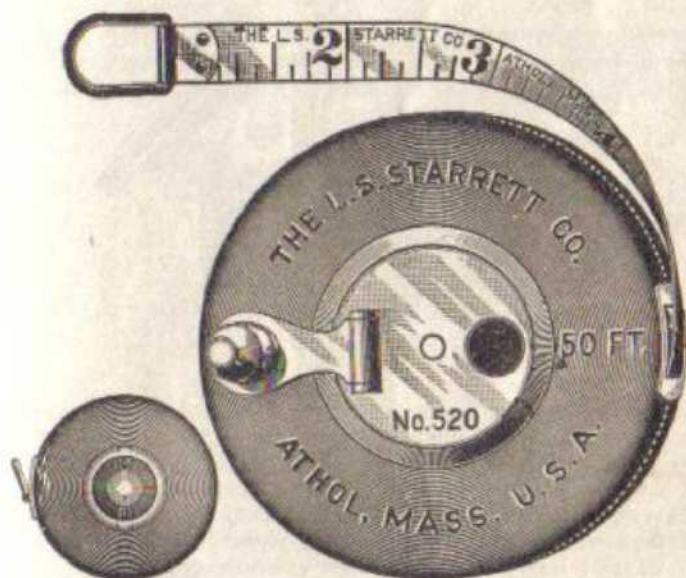
No. 511 are graduated in feet, tenths and hundredths of a foot. This style is especially adapted for surveyor's use.

PRICES NO. 510 AND NO. 511

25 feet, in case, $2\frac{1}{4}$ inch diameter, each.....	\$3.25
50 " " " $3\frac{1}{4}$ " " "	4.00
75 " " " $4\frac{1}{4}$ " " "	5.25
100 " " " $4\frac{1}{2}$ " " "	6.75

Steel Measuring Tapes in Leather Cases with Push Button

No. 520 and No. 521



These tapes are $\frac{3}{8}$ inch wide, graduated on one side in tenths or twelfths of a foot, in hard leather cases, with flush handle and push button on opposite side, a slight pressure of which will instantly release the handle. Trimmings nickel plated.

No. 520 are graduated in feet and twelfths of a foot, also in inches and eighths of an inch.

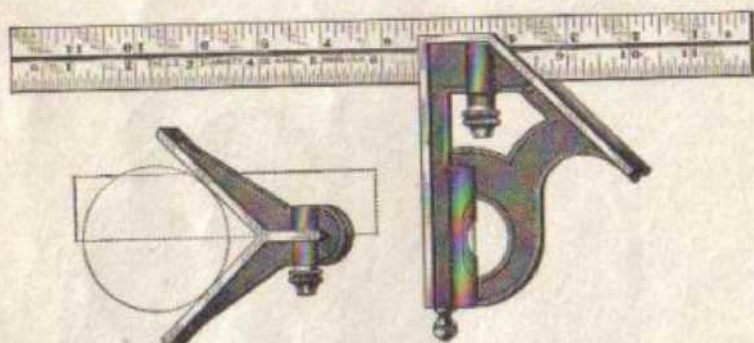
No. 521 are graduated in feet, tenths and hundredths of a foot. This style is especially adapted for surveyors' use.

PRICES NO. 520 AND NO. 521

25 feet, in case, $2\frac{1}{2}$ inch diameter, each.....	\$4.50
50 " " " $3\frac{1}{2}$ " " "	5.25
75 " " " $4\frac{1}{4}$ " " "	6.50
100 " " " $4\frac{1}{2}$ " " "	8.00

Starrett Patent Combination Square No. 11

With Hardened Blade



Every tool warranted accurate. With the adjustable scale this forms one of the most convenient and useful tools ever devised for mechanics' use. It is a complete substitute for a whole set of common try squares, and is one of the best gauges made for transferring exact measurements or laying out work. It is also convenient for a depth gauge, or to square in a mortise. For a miter it is perfect, while with the auxiliary center head it forms a centering square, both inside and outside, which for convenience and accuracy has no equal. The blades are hardened and graduated with heavy figures, reading both ways.

PRICES

4 inch, without center head or level.....	\$0.75
6 " with center head.....	\$1.50, without, 1.00
9 " " " "	1.75, " 1.25
12 " " " "	2.00, " 1.50
18 " " " "	2.75, " 2.25
24 " " " "	3.25, " 2.75

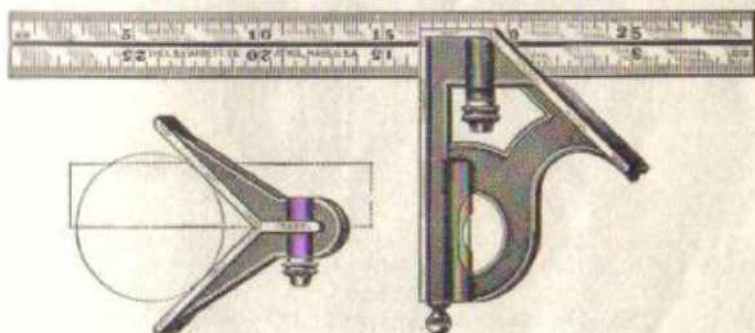
The 6, 9, 12, 18, and 24 inch have levels (in their stocks) and center heads, and will be sent complete unless otherwise ordered. The 18 and 24 inch have same stock as 12 inch.

The blades are graduated in No. 4, No. 1, No. 2, and No. 7 graduations. Those of No. 4 graduation being most used, will be sent unless otherwise ordered.

Starrett Patent Combination Square

No. 11M

With Hardened Blade



The same as No. 11, except that the blade is graduated in millimeters.

PRICES

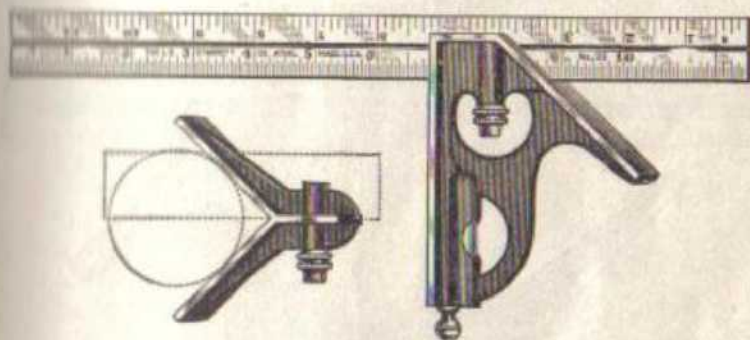
10 cm., without center head or level.....	\$0.75
15 " with center head.....	\$1.50, without, 1.00
20 " " " "	1.75, " 1.25
30 " " " "	2.00, " 1.50
40 " " " "	2.75, " 2.25
60 " " " "	3.25, " 2.75

PRICES OF SEPARATE PARTS OF SQUARES NO. 11, NO. 11M AND NO. 23

		Scale	Stock	Center Head
4 inch or 10 cm.....		\$0.50	\$0.50	
6 " 15 " .....		.75	.50	\$0.50
9 " 20 "		1.00	.50	.50
12 " 30 "		1.25	.75	.50
18 " 50 "		2.00	.75	.50
24 " 60 "		2.50	.75	.50

Scribers.....10 cents each.

Hardened Steel Combination Squares Starrett Patent No. 33



The above cut represents our new drop forged steel Combination Square. Both stock and center head are hardened, as well as the blade, which is graduated with heavy figures reading both ways. Guaranteed to be accurate.

PRICES

6 inch, with center head.....	\$2.50, without, \$2.00
9 " " " "	2.75, " 2.25
12 " " " "	3.00, " 2.50
18 " " " "	3.75, " 3.25
24 " " " "	4.25, " 3.75

For Bevel Protractor to use with above, see our No. 12, page 34.

No. 33M

The same as No. 33, except that the blade is graduated in millimeters.

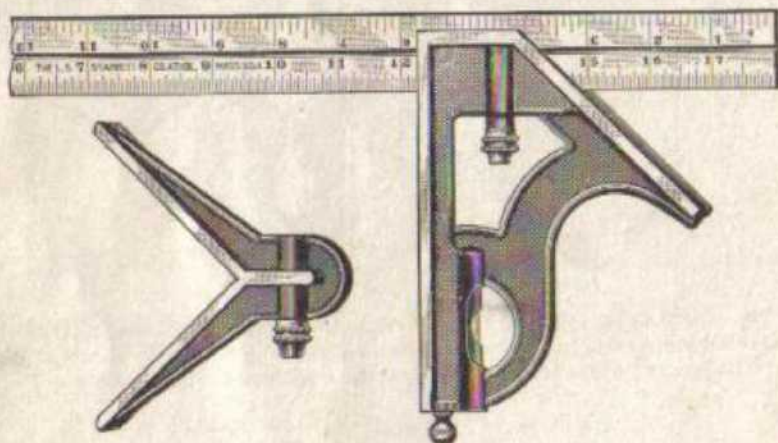
PRICES

15 cm., with center head.....	\$2.50, without, \$2.00
20 " " " "	2.75, " 2.25
30 " " " "	3.00, " 2.50
50 " " " "	3.75, " 3.25
60 " " " "	4.25, " 3.75

New Combination Squares

No. 17

With Hardened Blade



These squares are the same as our No. 11, except that the blades and stocks are a little larger, thereby increasing their usefulness as well as adding to their beauty.

PRICES												With Center Head.	With- out.
18 in., blade 14 in. wide, $\frac{3}{16}$ in. thick; 6 in. stock with 4 in. miter.												\$3.25	\$2.75
24	30	36	42	48	54	60	66	72	78	84	90	3.75	3.25

No. 17M

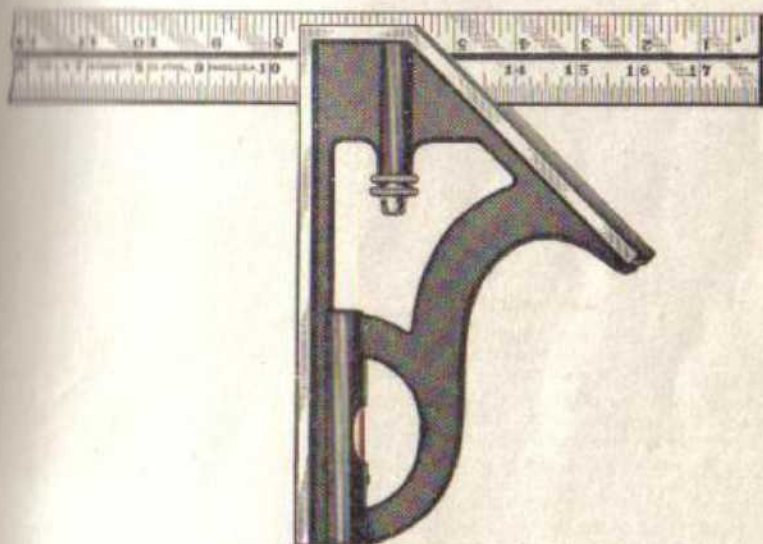
The same as No. 17, except that the blade is graduated in millimeters.

PRICES			
50 cm.....	with center head.	\$3.25, without,	\$2.75
60 ".....	" " " "	3.75, "	3.25

Special Standard Squares

No. 8

With Hardened Blade



This square is similar to No. 11, but is larger and heavier. It is designed for the use of manufacturers who desire to keep a reliable standard. No center head is made for this tool.

Prices

[illegible]

No. 8M

The same as No. 8, except that the blade is graduated in millimeters.

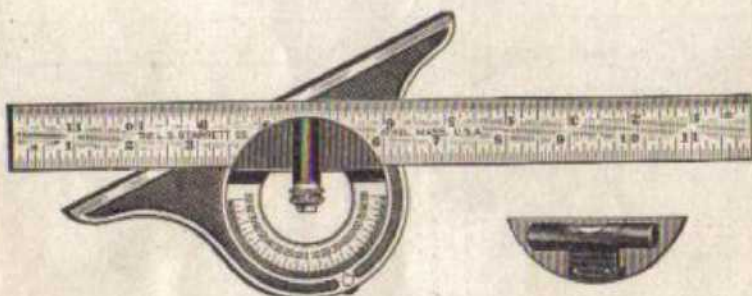
Pricks

50 cm.	.....	\$5.00
60 "	.....	6.00

Improved Bevel Protractors

No. 12

With Hardened Blade



An adjustable rule, held firmly at any point by a thumb nut, passes through a revolving turret which is nicely graduated in degrees from 0 to 90, both right and left, and can be accurately adjusted to show any angle.

A valuable auxiliary is made in the shape of a small level to be attached in place of the rule removed, forming an adjustable level to show any degree, thus greatly increasing the usefulness of the instrument.

As the use of the level is only occasional, however, as compared with that of the protractor, the level is not made a part of the protractor head, as in imitations of this tool, because it would thereby become as inconvenient when not needed as it is useful when actually wanted, and would be much more liable to be broken.

The blades are the same as those used on our No. 11 squares. Those of No. 4 graduation will be sent unless otherwise ordered. The head is 7 inches long.

PRICES

9 inch, complete.....	\$2.75
12 " "	3.00
18 " "	3.50
24 " "	4.00
Protractor Head with Level attachment.....	2.00
Level only.....	.25

No. 12M

The same as No. 12 except that the blade is graduated in millimeters.

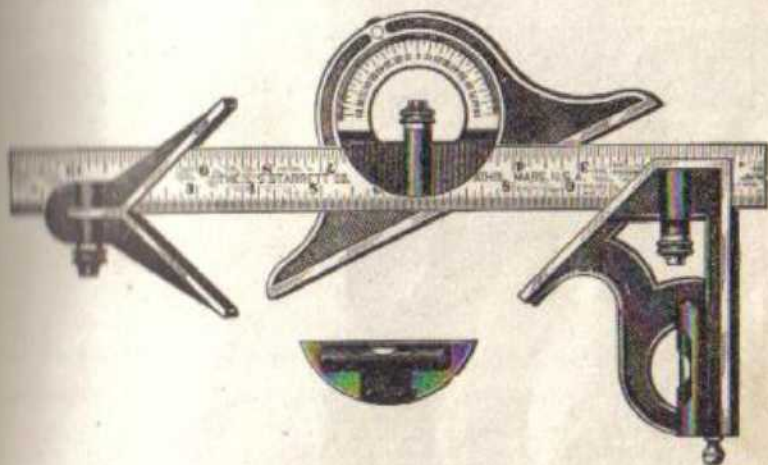
PRICES

20 cm.....	\$2.75	50 cm.....	\$3.50
30 cm.....	3.00	60 cm.....	4.00

Combination Sets

No. 9

With Hardened Blade



This cut shows Combination Square (No. 11, page 28) with center head and 7 inch Bevel Protractor head (No. 12, page 34), all on the No. 11 square scale. Each head may be instantly removed, or replaced and used interchangeably with the scale, thus forming the most useful combination set of tools ever devised for mechanics' use.

PRICES

9 inch, set complete.....	\$3.75
12 " " " ".....	4.00
18 " " " ".....	4.75
24 " " " ".....	5.25

No. 9M

The same as No. 9, except that the blade is graduated in millimeters.

PRICES

20 cm.....	\$3.75
30 ".....	4.00
50 ".....	4.75
60 ".....	5.25

Patent Inclınometers

No. 10

With Hardened Blade



The above cut represents an inclınometer, try square, and bevel protractor combined.

It is compact, convenient, and a complete and perfect substitute for several costly tools.

It consists of a stock and disc, both slotted to receive the blade, which folds in the stock. The blade attached to the graduated rotary disc may be secured at any angle from 0 to 90 degrees, and by loosening the clamp screw it may be shortened or extended full length, or removed for a straight edge.

The working face of the stock, extending both sides of the blade, admits of its being reversed, so that the same angle may be laid off in opposite directions without changing the angle in the tool, thus requiring but $\frac{1}{2}$ of a graduated circle to obtain all angles both ways.

At 90 degrees, the blade brings up against a casehardened screw, accurately adjusted, thus forming a try square; by holding the blade perpendicular (the level in the stock being at right angles), a plumb; by folding the tool, a level, length of blade.

The blades are graduated one edge each in 8ths, 16ths, 32ds, and 64ths.

PRICES

With 12 inch blade.....	\$4.00
" 18 " "	5.00
" 24 " "	6.00
Center head, to fit all sizes.....	.75

No. 10M

The same as No. 10, except that the graduation is in millimeters.

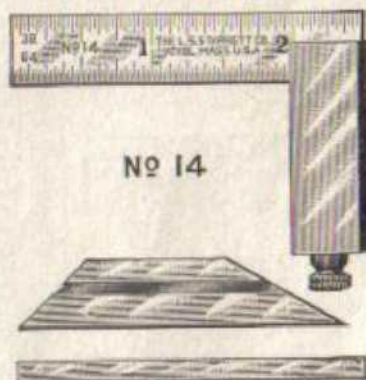
PRICES

With 30 cm. blade.....	\$4.00
" 50 " "	5.00
" 60 " "	6.00

Double Steel Squares

No. 14

With Hardened Blade



This cut represents a double *solid steel* square, with our patent $2\frac{1}{2}$ -inch sliding scale, and is especially designed for fine tool makers. The rule being narrow and instantly adjusted to any length, however short, allows it to be used where it would be impossible to use any square with a fixed blade. The scale is graduated on one side only, in 32ds and 64ths.

Fitted to go with this stock, we make not only a bevel blade, but a very narrow straight one, about $\frac{1}{8}$ -inch wide, highly prized by die makers for squaring small holes, both of which blades will be sent with the square unless otherwise ordered.

PRICES

Square.....	\$2.00
" with either bevel or narrow blade....	2.30
" complete.....	2.60

No. 14M

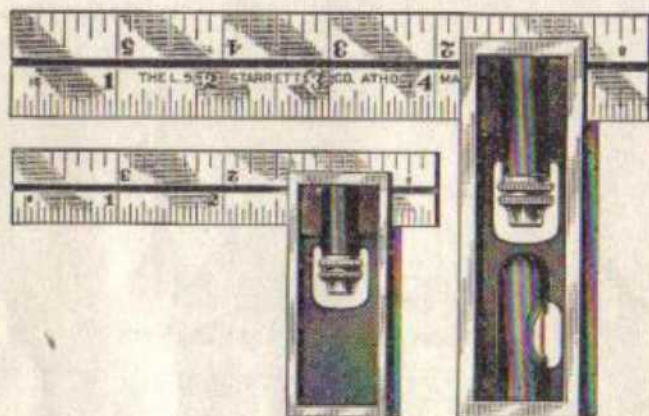
With Hardened Blade

With 5 cm. blade, graduated in millimeters, otherwise the same as No. 14.
PRICES the same as for No. 14.

Patent Double Square

No. 13.

With Hardened Blade.



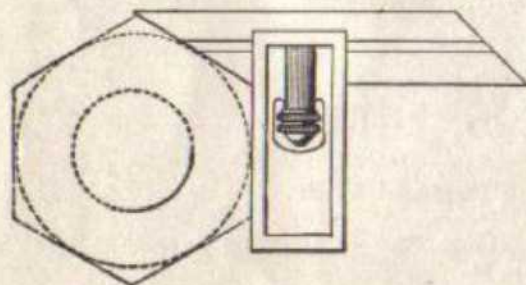
This square is conceded the most practical one for machinists' and fine tool makers' use ever offered. The sliding scale, shortened or extended full length, makes it more valuable than a full set of the common kind, while with the extra bevel blade, shown in the following cut, we have both the hexagon and octagon angles.

The seat against which the blade is clamped being convex, should corners of the blade get injured, the accuracy of the square is not affected.

PRICES

4 inch	\$1.25,	with both blades, \$1.65
6 "	2.00,	" " 2.50
9 "	3.00	
12 "	4.00	

Both blades with 4 and 6 inch always sent unless otherwise ordered.
There is a level in the stocks of the 6 inch, 9 inch, and 12 inch squares.



The blades are graduated in No. 4, No. 1, No. 2, and No. 7 graduations. Those of No. 4 graduation will be sent unless otherwise ordered.

This cut represents the 4 inch and 6 inch double square, with hexagon end of blade applied. Reverse it and the octagon is in position for use. Bevel blades are made to fit only 4 inch and 6 inch sizes.

Patent Double Squares

No. 13M

With Hardened Blade

The same as No. 13, except that the blade is graduated in millimeters.

PRICES

10 cm.	\$1.25, with both blades.	\$1.65
15 "	2.00, " " " "	2.50
20 "	3.00	
30 "	4.00	

No. 13G

With Hardened Blade

The same as No. 13, except that one side of the stock is grooved, making the tool convenient for use on round work, without impairing its value for ordinary purposes.

PRICES

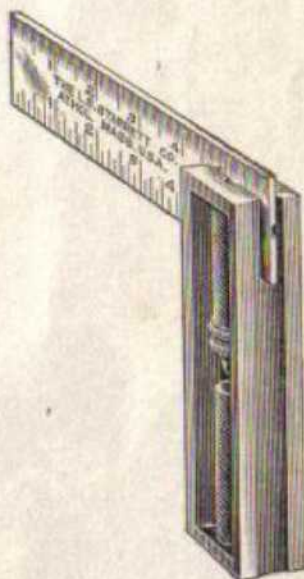
4 inch	\$1.50, with both blades.	\$1.90
6 "	2.35, " " " "	2.85
9 "	3.50	
12 "	4.50	

No. 13GM

The same as No. 13G except that the blade is graduated in millimeters.

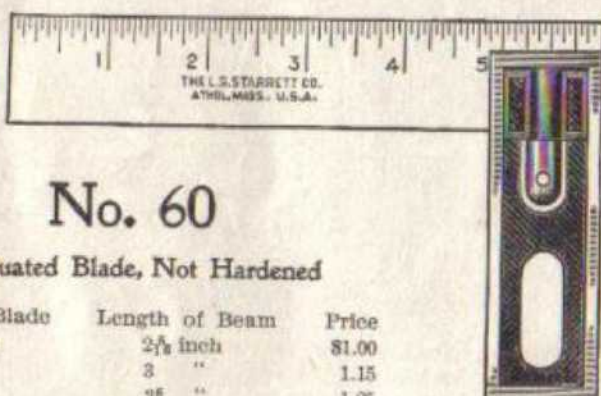
PRICES

10 cm.	\$1.50, with both blades.	\$1.90
15 "	2.35, " " " "	2.85
20 "	3.50	
30 "	4.50	



"Reliable" Try Squares

The following cuts represent a line of Try Squares, handsome in design, light and convenient. The blade is not riveted or soldered to the stock, but is firmly held by our patent bolt and nut, by means of which the tool can be readily taken apart, and when worn the blade and stock can be reground or lapped, and put together again as good as new.



No. 60

Graduated Blade, Not Hardened

Length of Blade	Length of Beam	Price
4 inch	2 ¹ / ₈ inch	\$1.00
5 "	3 "	1.15
6 "	3 ⁵ / ₈ "	1.25
9 "	5 ¹ / ₈ "	2.00
12 "	6 "	2.75

No. 60M

The same as No. 60, except that the blades are graduated in millimeters.

PRICES

10 cm.....	\$1.00
15 ".....	1.25
20 ".....	2.00
30 ".....	2.75

"Reliable" Try Squares

THE L. S. STARRETT CO.,
ATHOL, MASS., U.S.A.

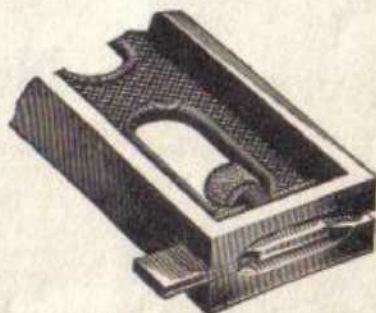
No. 61

Blade with Hardened Edge, Not Graduated

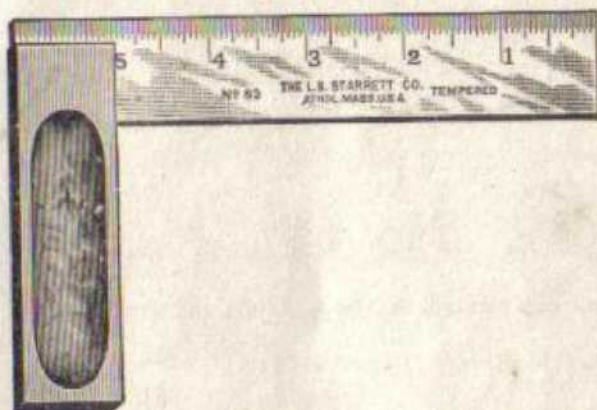
Length of Blade	Length of Beam	Price
4 inch	2 $\frac{1}{2}$ inch	\$1.25
5 "	3 "	1.50
6 "	3 $\frac{1}{2}$ "	1.75
9 "	5 $\frac{1}{2}$ "	2.25
12 "	6 "	3.00
18 "	9 "	12.00
24 "	12 "	18.00



The 18 inch and 24 inch sizes of No. 61 Squares are equipped with the convenient stock support as illustrated, which projects beyond the side of the stock, or, when not in use, is contained wholly within the stock, and may be clamped firmly in either position.



Graduated Hardened Steel Squares No. 63



The above cut represents our newly designed, hardened, solid steel try square. This square has concave depressions in each side of the stock, which not only reduce its weight but make it more convenient to hold between the thumb and finger while being used. The stocks are casehardened, the blades hardened to spring temper and graduated in 32ds of an inch on one side and 64ths on the other.

PRICES

2 inch.....	\$1.50
3 ".....	2.00
4 ".....	2.50
6 ".....	3.50
9 ".....	5.50
12 ".....	6.50

No. 63M

The same as No. 63, except that the blade is graduated in millimeters.

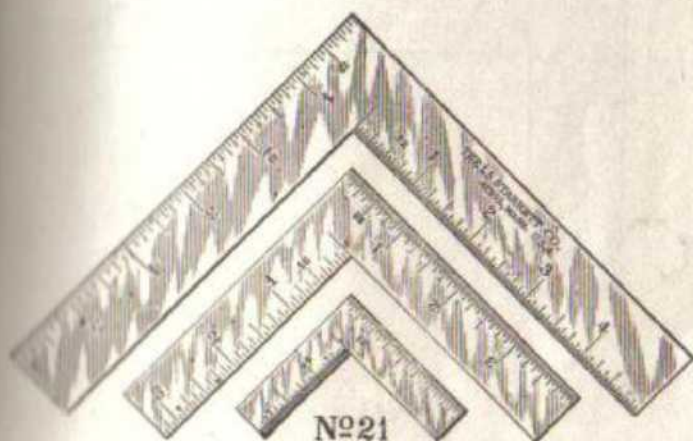
PRICES

5 cm.....	\$1.50
10 ".....	2.50
15 ".....	3.50
20 ".....	5.50
30 ".....	6.50

Thin Steel Try Squares

No. 21

For Machinists and Draughtsmen



PRICES

Size	Thickness	Grad.	16ths and 64ths one side, 32ds and 64ths other.	Price
8 inch	1/8 inch	grad.	16ths and 64ths one side, 32ds and 64ths other.	\$1.00
6 inch	1/8 inch	grad.	16ths and 64ths one side, 32ds and 64ths other.	1.50
4 inch	1/8 inch	grad.	16ths and 32ds both sides	2.00
3 inch	1/8 inch	grad.	16ths and 32ds both sides	3.00
2 inch	1/8 inch	grad.	16ths and 32ds both sides	4.00
1 1/2 inch	1/8 inch	grad.	16ths and 32ds both sides	5.00

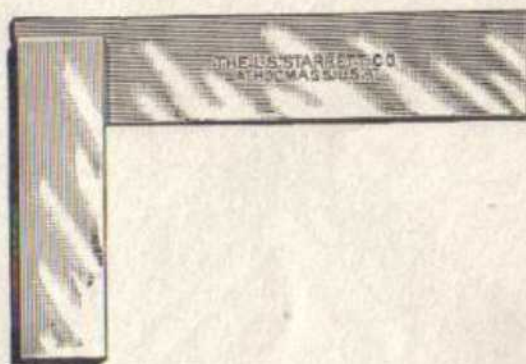
No. 21M

The same as No. 21, except that the graduation is in millimeters.

PRICES

Size	Price
8 inch	\$1.00
6 inch	2.00
4 inch	3.00
3 inch	4.00

Hardened Edge Solid Steel Square



No. 20

Not Graduated

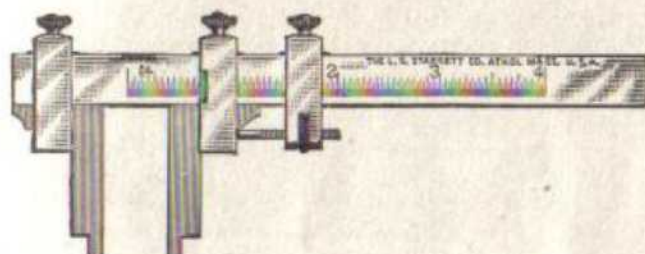
PRICES

1 inch blade, inside beam.....	\$1.50
1½ " " " "	1.75
2 " " " "	2.00
3 " " " "	2.50
4½ " " " "	3.50
6 " " " "	4.50
9 " " " "	6.50
12 " " " "	9.00
15 " " " "	15.00
18 " " " "	18.00
24 " " " "	25.00

NOTE.—Prices for larger sizes will be quoted on application.

Caliper Square

No. 25



The above cut represents an improved tool for both outside and inside measure. The beam is graduated, 64ths on one side, 100ths on the other.

PRICES

3 in. with adjusting screw.....	\$3.50.	without, \$3.00
4 " " " "	4.00,	" 3.50
6 " " " "	5.50,	" 5.00
With hardened jaws, extra.....		1.50
In Leatherette case, extra.....		.75

Sent without case unless otherwise ordered.

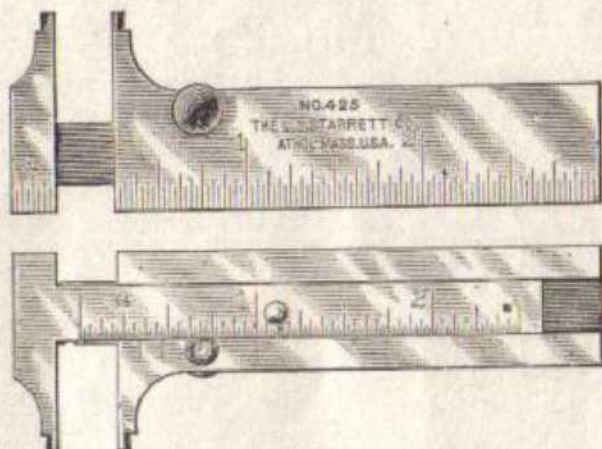
No. 25M

The 4 in. Caliper Square, with adjusting screw, is also graduated in $\frac{1}{2}$ millimeters on one side and 64ths inch on the other.

PRICE.....\$4.00

Pocket Slide Calipers

No. 425



Graduated in 32ds and 64ths. The improved clamping device is a valuable feature.

PRICES

3 inch.....	\$2.00
5 ".....	3.00

Also made with Metric graduations at the same price.

No. 425A

Graduated in 32ds on the stock and 100ths on the slide.

Prices same as for No. 425.

Button Gauge

No. 431

This gauge is the same size and similar to our No. 425 Pocket Slide Caliper. The difference is that this gauge is graduated to 32ds and on the slide to 40ths of an inch.

PRICES

3 inch.....	\$2.00
5 ".....	3.00

Slide Rule Caliper and Circumference Gauge

No. 424



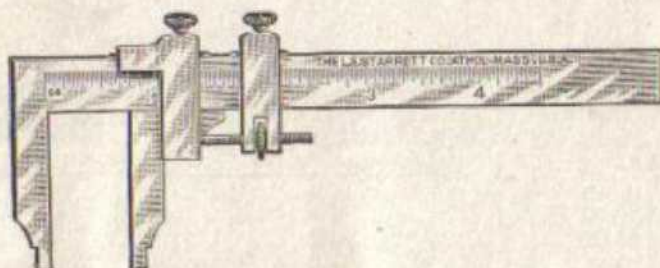
This gauge has a double function—being graduated to read the circumference as well as the diameter of the thing measured, the relation of circumference to diameter being shown by the graduations on upper corners of the rule (capacity $1\frac{1}{2}$ inches, about 11 inches circumference). It was originally designed for rope or cordage manufacturers. It makes a first-class slide rule caliper of large scope, opening $3\frac{1}{2}$ inches. The jaws, being $1\frac{1}{2}$ inches deep, will caliper a cylinder up to $2\frac{1}{2}$ inches in diameter. The rule is graduated in 32ds of an inch standard and 16ths of an inch circumference measure. All corners of the tool are rounded smooth to make it fit to carry in the pocket and agreeable to handle. The circumference measure will assist in calculating how many feet a minute the cutting tool in a lathe is doing on any diameter within the scope of the gauge and so help determine whether the tools should have a faster or slower speed.

RULE :—The circumference being shown by the gauge, multiply the same by the speed the lathe runs per minute and the result will show the number of inches or feet the circumference is running and the tool cutting.

PRICE.....\$3.50

Caliper Square

No. 426



This Caliper Square is designed both for inside and outside measurements. It is made with firm and adjustable jaw. The beam is nicely graduated on one side in 64ths and on the other in 100ths of an inch. With the adjusting screw the sliding head can be more accurately set to the graduations than without it. Sent with adjusting screw and without case unless otherwise ordered.

PRICKS

3 in., with adjusting screw.....	\$3.75,	without, \$3.00
4 " " " "	4.50,	" 3.50
6 " " " "	7.50,	" 5.50
With hardened jaws.....	\$1.50 extra	
Leatherette case.....	.75	"

Sent without case unless otherwise ordered.

No. 426M

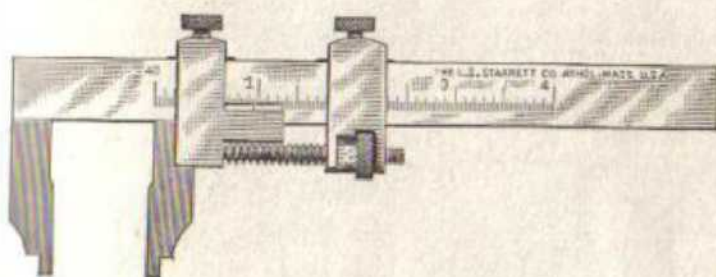
Same as No. 425 only with beam graduated on one side in $\frac{1}{4}$ mm. and on the other in 100ths of an inch.

PRICES

10 cm., with adjusting screw.....	\$4 50,	without, \$3.50
15 " " " "	7 50,	" 5.50
With hardened jaws.....		\$1.50 extra
Leatherette case.....		.75 "

Micrometer Caliper Square

No. 28



For Outside and Inside Measure

This instrument enables one to enlarge or decrease work one or more thousandths from that calipered, and fills the bill for both a first-class caliper square and micrometer of large scope and quick adjustment. The jaws are 12 inches long, hardened, and open four inches. One side of the beam is graduated in 64ths and the other in 40ths; and either side may be used as a common caliper square, or, through the micrometer, to show 1,000ths full length, on either inside or outside work. This is done by first setting the indicator mark on the movable jaw to agree with any division nearest the size wanted. Fasten it there, slack binding clasp, and turn the micrometer nut to agree with indicator mark on the clasp; now tighten this, slack movable jaw and turn micrometer nut, counting 1,000ths, adding to or taking from the division shown on beam at the starting point.

An excellent feature of this instrument is the spiral spring between jaw and clasp, which not only takes up all backlash, but limits the pressure against the work to strength of spring. This is instantly felt through released pressure on the nut, and prevents springing the jaws, thus calipering to a nicety.

PRICES

4 in., with case.....	\$8.75, without.	\$8.00
6 " " "	11.00, " "	10.00
9 " " "	15.25, " "	14.00
12 " " "	19.50, " "	18.00

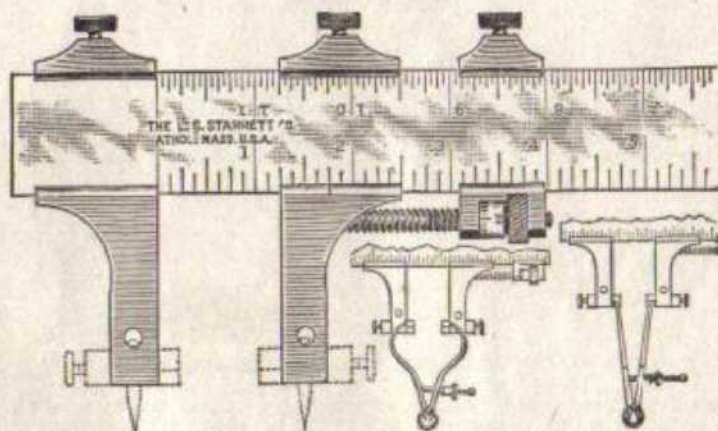
Sent with case unless otherwise ordered.

No. 28M

This tool is also made with graduations to $\frac{1}{2}$ mm. on one side, and either 64ths or 100ths of an inch on the other. The micrometer nut is graduated to read to hundredths of a millimeter.

Prices same as above.

Micrometer Caliper Gauges No. 24



This gauge is made to fit scales $1\frac{1}{2}$ in. wide, .085 in. thick, and 12, 18, 24 and 36 in. long, affording longer scope than anything of the kind heretofore made. The head of the gauge carries auxiliary Tram Points. Attachments are also made to slip on and off the ends of the caliper, so that they may be used for making close or drive fits. These attachments are made of the best tool steel, hardened and ground. The inside calipers are set against the inside face of gauge and resting on the seat of the attachments, which keep them in perfect line. The outside calipers are set against an extended seat of the attachment in line with the inside faces of the gauge so that both inside and outside calipers may be set to exactly agree with each other.

For measuring distances, the gauge may not only be set by the graduated scale but varied by the micrometer adjusting nut to read additional thousandths. The scale and all necessary working parts are hardened, making a first-class tool in every respect.

PRICES

12 inch.....	\$11.00
18 ".....	12.50
24 ".....	14.00
36 ".....	20.00

No. 24M

The same as No. 24, except that the scales are graduated in millimeters, and the nut to hundredths of a millimeter.

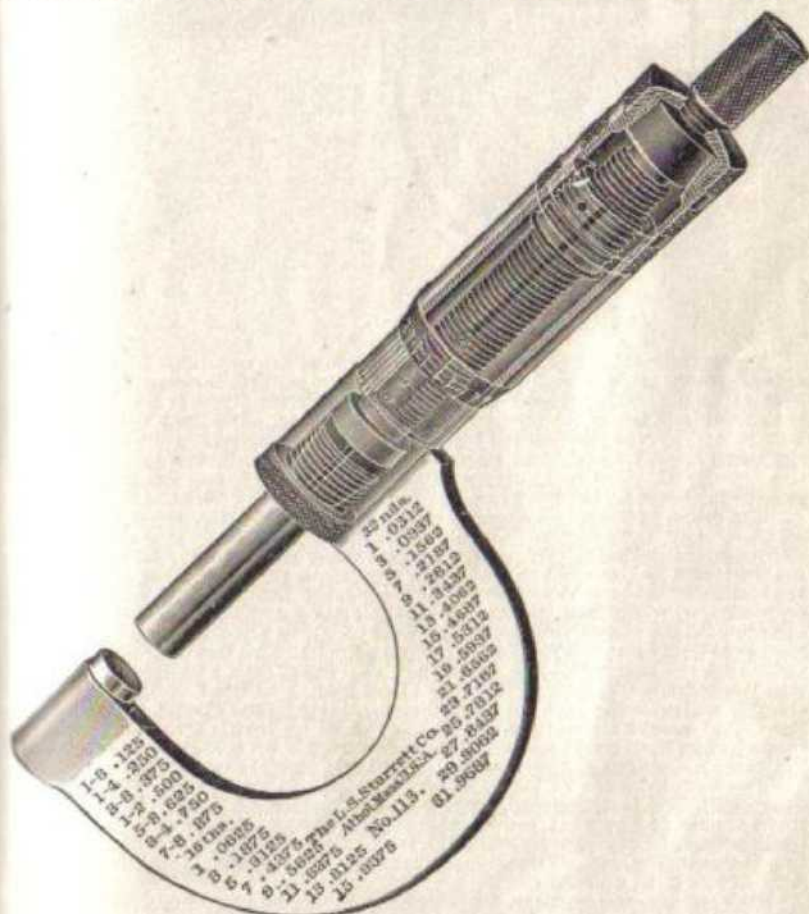
PRICES

30 cm.....	\$11.00
50 ".....	12.50
60 ".....	14.00
90 ".....	20.00

Starrett Micrometers

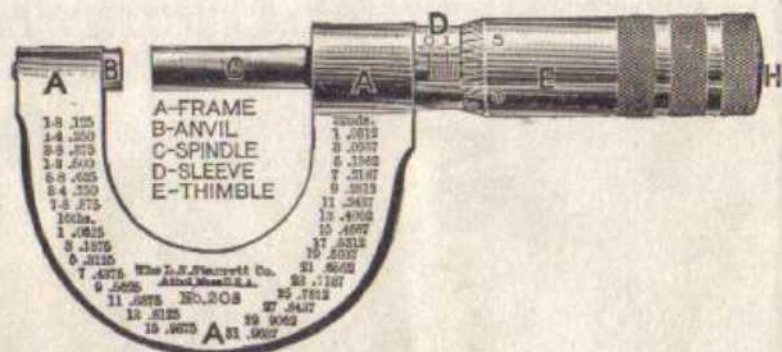
Features of Superiority—Patented

Our micrometers have a more exact and easier way of adjustment than by the old method of a movable anvil. This is obtained by placing over the barrel a thin, graduated sleeve, which carries the base or zero line, instead of having this line marked on the barrel itself. This sleeve may be turned



by means of a small spanner wrench to bring the zero line correct to compensate for wear. The thin sleeve also keeps dirt from the screw. A knurled locking nut contracting a split bushing around the spindle tightens and keeps the spindle central and true, or by a slight turn locks it firm, making a solid gauge when desired.

How to Read a Micrometer



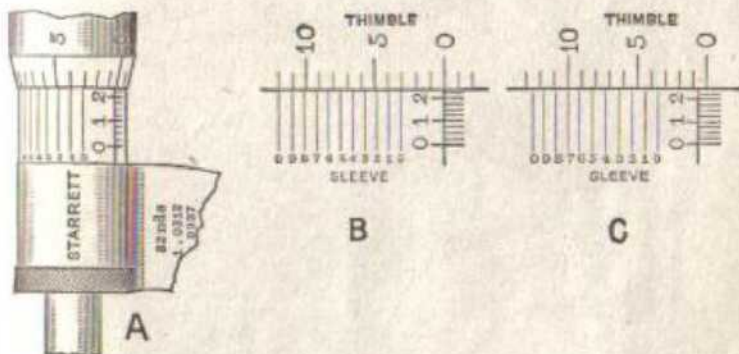
The spindle C is attached to the thimble E at the point H. The part of the spindle which is concealed within the sleeve and thimble is threaded to fit a nut in the frame A. The frame being held stationary, the thimble E is revolved by the thumb and finger, and the spindle C being attached to the thimble revolves with it, and moves through the nut in the frame, approaching or receding from the anvil B. The article to be measured is placed between the anvil and the spindle C. The measurement of the opening between the anvil and the spindle is shown by the lines and figures on the sleeve D and the thimble E.

The pitch of the screw threads on the concealed part of the spindle is 40 to an inch. One complete revolution of the spindle therefore moves it longitudinally one fortieth (or twenty-five thousandths) of an inch. The sleeve D is marked with 40 lines to the inch, corresponding to the number of threads on the spindle. When the micrometer is closed, the beveled edge of the thimble coincides with the line marked 0 on the sleeve, and the 0 line on the thimble agrees with the horizontal line on the sleeve. Open the micrometer by revolving the thimble one full revolution, or until the 0 line on the thimble again coincides with the horizontal line on the sleeve; the distance between the anvil B and the spindle C is then $\frac{1}{40}$ (or .025) of an inch, and the beveled edge of the thimble will coincide with the second vertical line on the sleeve. Each vertical line on the sleeve indicates a distance of $\frac{1}{40}$ of an inch. Every fourth line is made longer than the others, and is numbered 0, 1, 2, 3, etc. Each numbered line indicates a distance of four times $\frac{1}{40}$ of an inch, or one tenth.

The beveled edge of the thimble is marked in twenty-five divisions, and every fifth line is numbered, from 0 to 25. Rotating the thimble from one of these marks to the next moves the spindle longitudinally $\frac{1}{1000}$ of twenty-five thousandths, or one thousandth of an inch. Rotating it two divisions indicates two thousandths, etc. Twenty-five divisions will indicate a complete revolution, .025 or $\frac{1}{40}$ of an inch.

To read the micrometer, therefore, multiply the number of vertical divisions visible on the sleeve by 25, and add the number of divisions on the bevel of the thimble, from 0 to the line which coincides with the horizontal line on the sleeve. For example, as the tool is represented in the engraving, there are seven divisions visible on the sleeve. Multiply this number by 25, and add the number of divisions shown on the bevel of the thimble, 3. The micrometer is open one hundred and seventy-eight thousandths. ($7 \times 25 = 175 + 3 = 178$.)

How to Read a Ten-Thousandths Micrometer



Readings in ten thousandths of an inch are obtained by the use of a vernier, so named from Pierre Vernier, who invented the device in 1631. As applied to a micrometer this consists of ten divisions on the adjustable sleeve, which occupy the same space as nine divisions on the thimble. The difference between the width of one of the ten spaces on the sleeve and one of the nine spaces on the thimble is therefore one tenth of a space on the thimble. In engraving B the third line from 0 on thimble coincides with the first line on the sleeve. The next two lines on thimble and sleeve do not coincide by one tenth of a space on thimble; the next two, marked 5 and 2, are two tenths apart, and so on. In opening the tool, by turning the thimble to the left, each space on the thimble represents an opening of one thousandth of an inch. If therefore the thimble be turned so that the lines marked 5 and 2 coincide, the caliper will be opened two tenths of one thousandth or two ten thousandths. Turning the thimble further, until the line 10 coincides with the line 7 on the sleeve, as in engraving C, the caliper has been opened seven ten thousandths, and the reading of the tool is .2257.

To read a ten thousandths micrometer, first note the thousandths as in the ordinary micrometer, then observe the line on the sleeve which coincides with a line on the thimble. If it is the second line, marked 1, add one ten thousandth; if the third, marked 2, add two ten thousandths, etc.

Micrometers with Finger Ring

See illustration on preceding page

PRICES

No. 220	For measurement by thousandths up to one inch, with lock nut and ratchet stop.....	\$6.75
	In Leather case.....	7.25
No. 221	For measurement by thousandths up to one half inch, with lock nut and ratchet stop.....	5.75
	In Leather case.....	6.25

NOTE.—The finger ring will be furnished on any of our micrometers, when ordered, at an additional cost of 75 cents.

Ratchet Stop for Micrometers



In using this device, the ratchet slips by the pawl when more than a certain amount of pressure is applied, and so prevents the measuring spindle from turning farther and perhaps springing the instrument.

It is valuable where a number of measurements have to be taken quickly and especially where measurements are taken by more than one person with the same micrometer, as by its use the same amount of pressure is applied to the objects measured, in each case.

One Inch Micrometers

No. 3

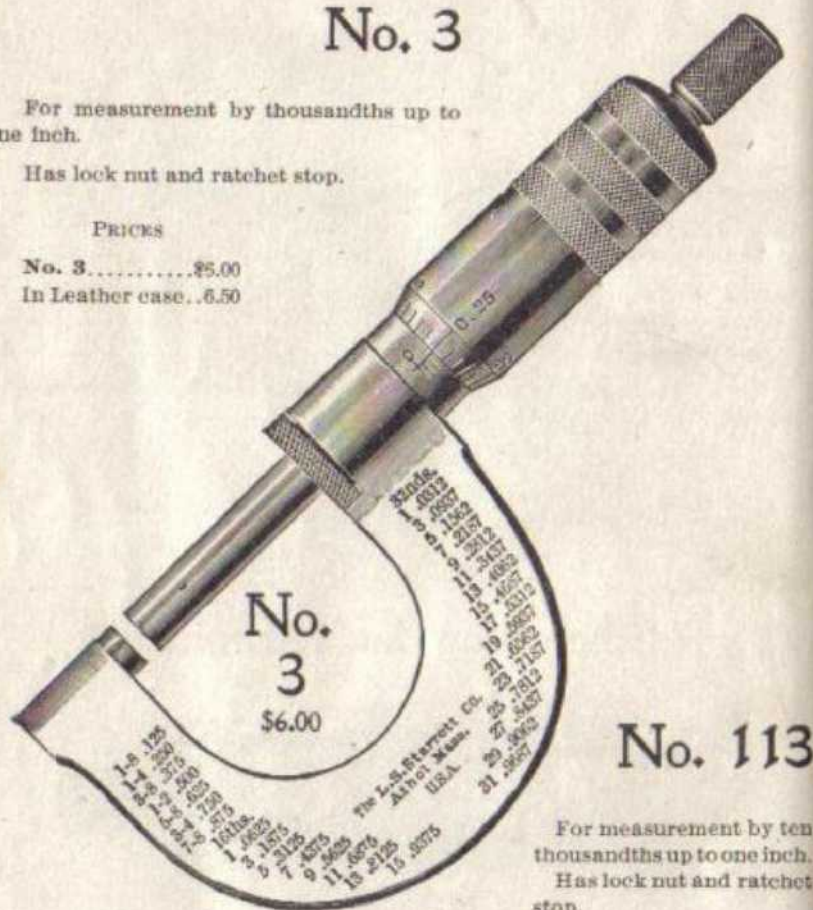
For measurement by thousandths up to one inch.

Has lock nut and ratchet stop.

PRICES

No. 3.....\$5.00

In Leather case..6.50



No. 113

For measurement by ten thousandths up to one inch.

Has lock nut and ratchet stop.

PRICES

No. 113.....\$7.00

In Leather case.....7.50

Both No. 3 and No. 113 sent in case unless otherwise ordered.

One Inch Micrometers

No. 203

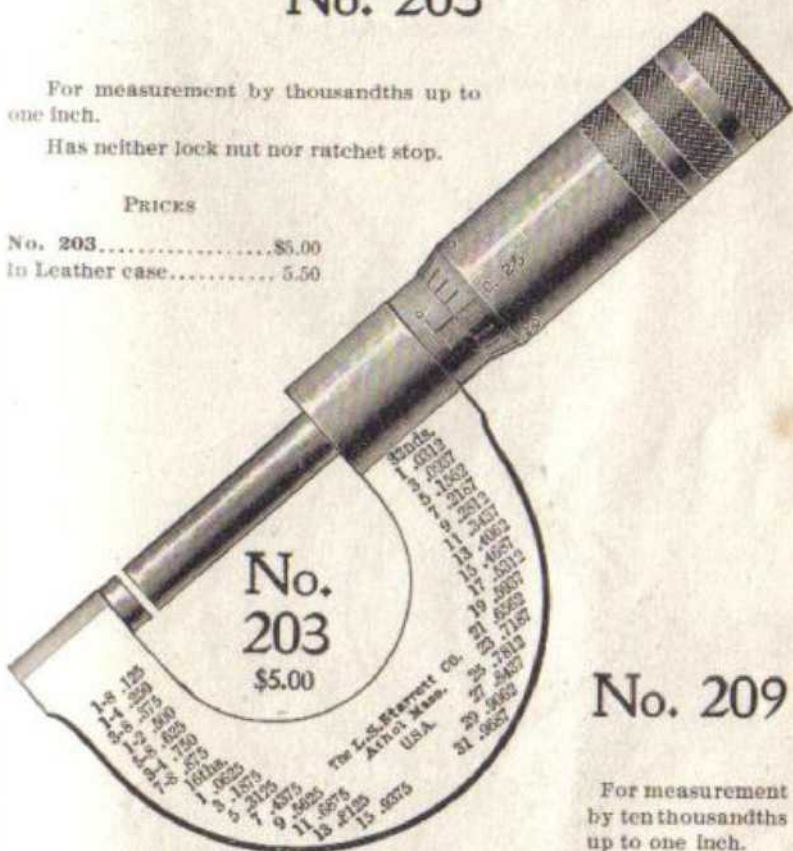
For measurement by thousandths up to one inch.

Has neither lock nut nor ratchet stop.

PRICES

No. 203.....\$5.00

In Leather case..... 5.50



No. 209

For measurement by ten thousandths up to one inch.

Has neither lock nut nor ratchet stops.

PRICES

No. 209.....\$0.00

In Leather case..... 6.50

Both No. 203 and No. 209 sent in case unless otherwise ordered.

One Inch Micrometers

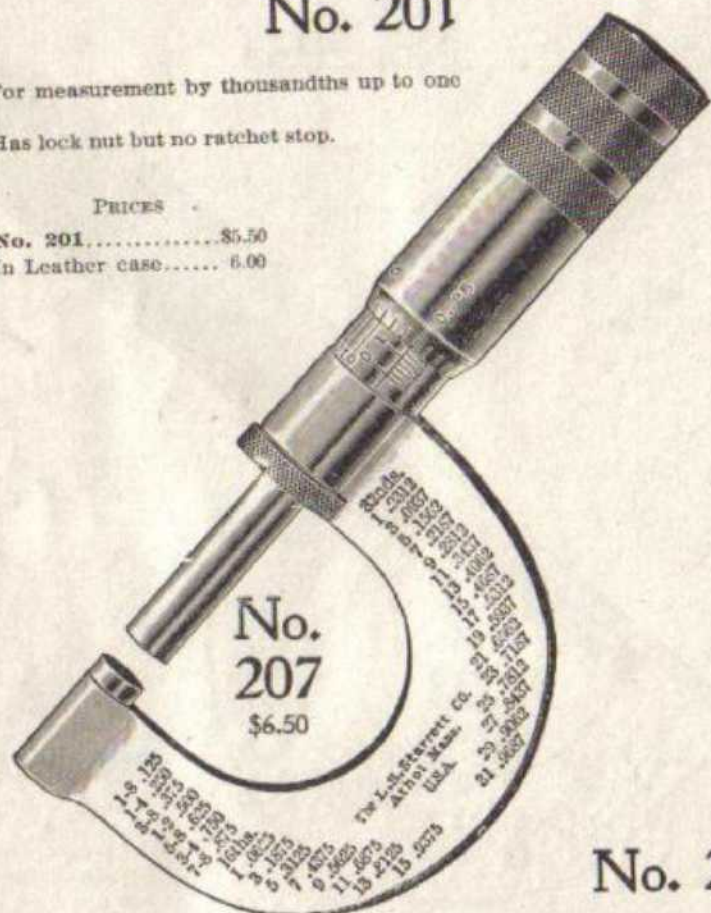
No. 201

For measurement by thousandths up to one inch.

Has lock nut but no ratchet stop.

PRICES

No. 201.....	\$5.50
In Leather case.....	6.00



No. 207

For measurement by ten thousandths up to one inch.
Has lock nut but no ratchet stop.

PRICES

No. 207.....	\$6.50
In Leather case.....	7.00

Both No. 201 and No. 207 sent in case unless otherwise ordered.

One Inch Micrometers

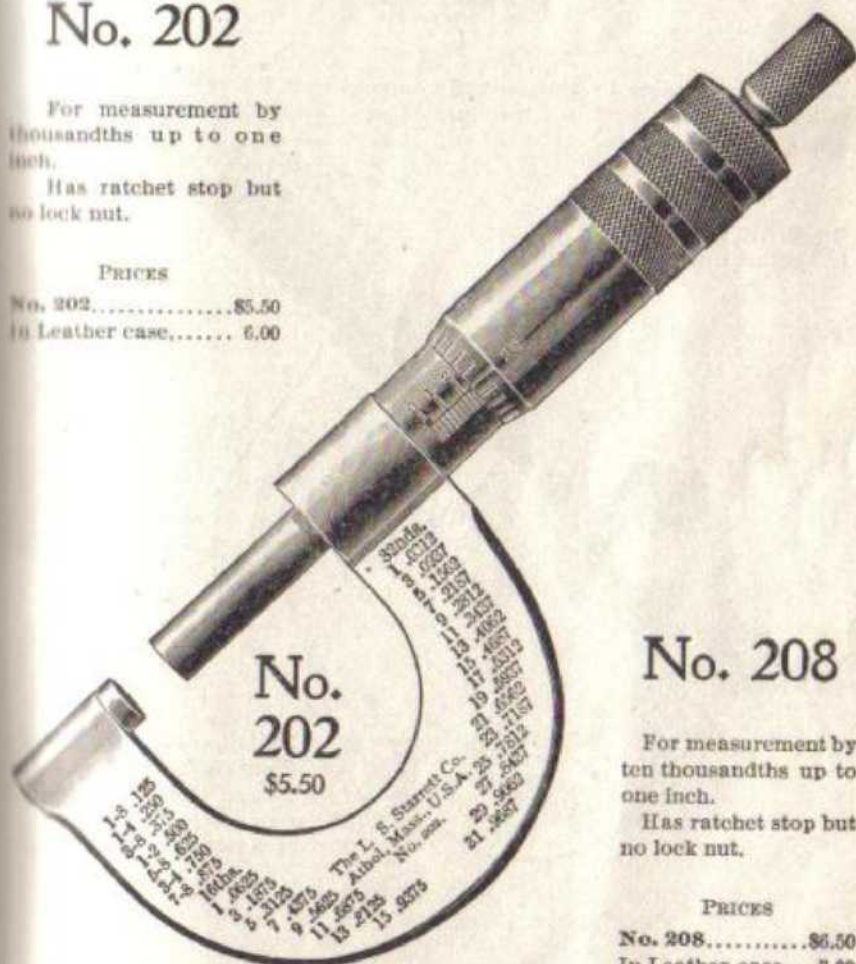
No. 202

For measurement by
thousandths up to one
inch.

Has ratchet stop but
no lock nut.

PRICES

No. 202.....\$5.50
in Leather case..... 6.00



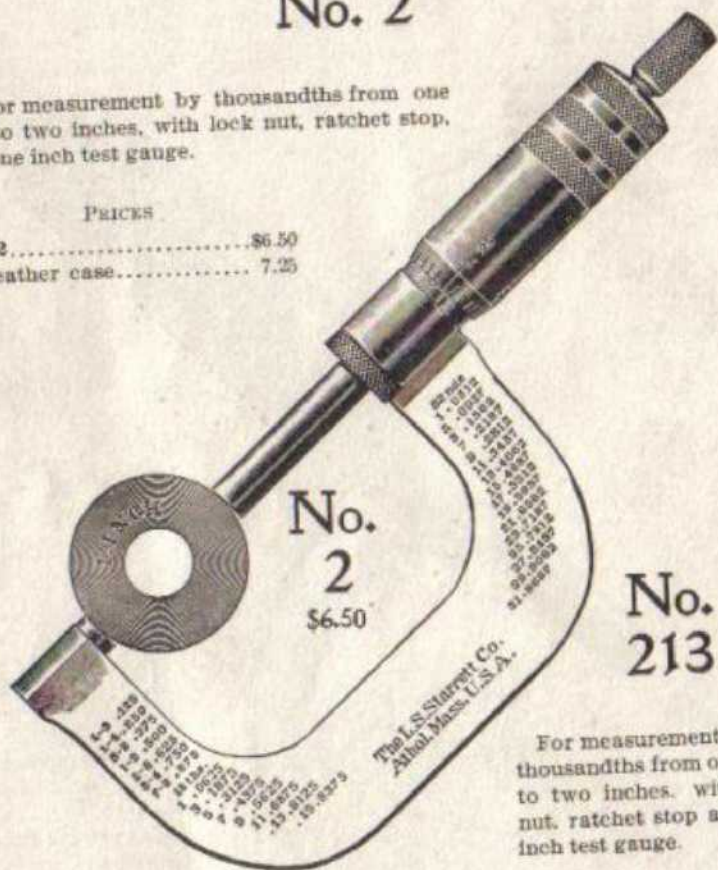
Two Inch Micrometers

No. 2

For measurement by thousandths from one inch to two inches, with lock nut, ratchet stop, and one inch test gauge.

PRICES

No. 2.....	\$6.50
In Leather case.....	7.25



No. 213

For measurement by ten thousandths from one inch to two inches, with lock nut, ratchet stop and one inch test gauge.

PRICES

No. 213.....	\$7.50
In Leather case.....	8.25

Both No. 2 and No. 213 sent in case unless otherwise ordered.
No. 212 attachment (page 62) can be used with these micrometers.

Two Inch Micrometers

No. 217

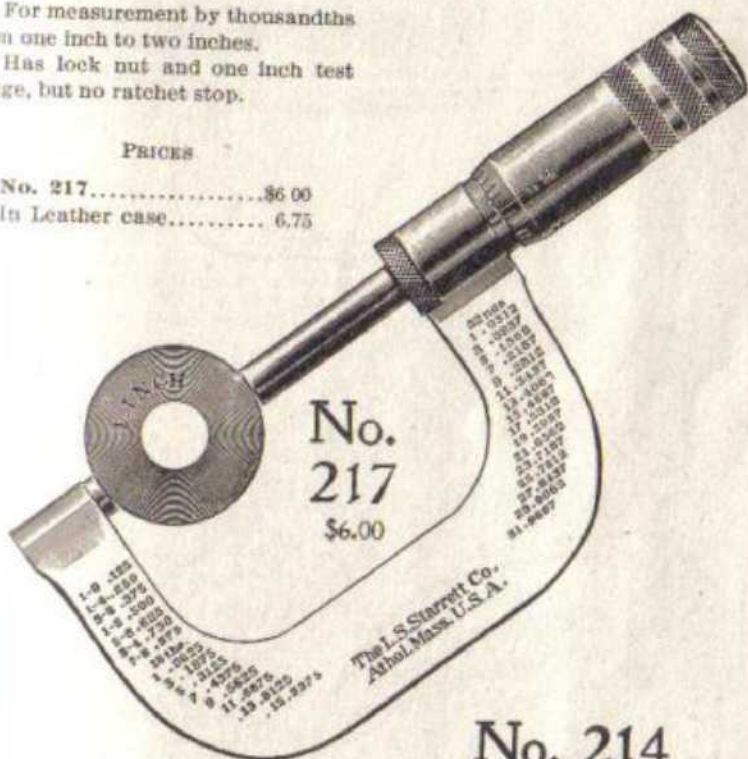
For measurement by thousandths
from one inch to two inches.

Has lock nut and one inch test gauge, but no ratchet stop.

PRICES

No. 217.....\$6.00

In Leather case.....	6.75
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No. 214

For measurement by ten thousandths from one inch to two inches.
Has lock nut and one inch test gauge, but no ratchet stop.

Prices

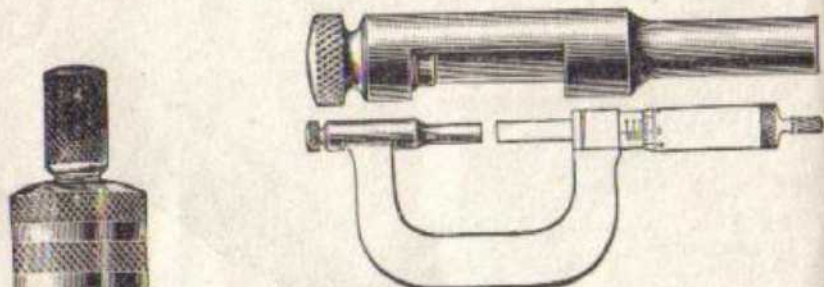
No. 214.....\$7.00

In Leather case.....	7.75
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Both No. 217 and No. 214 sent in case unless otherwise ordered.

No. 312 attachment (page 62) can be used with these micrometers.

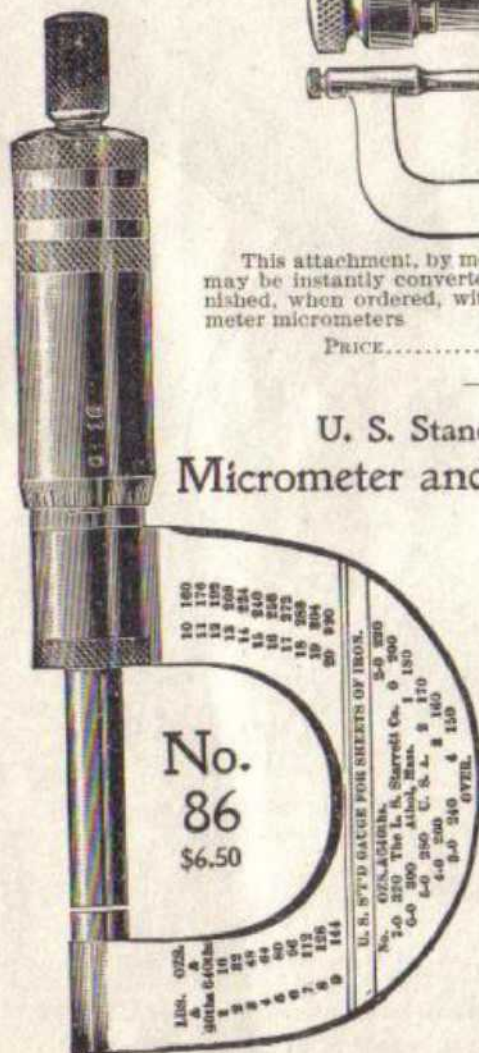
Attachment for Two Inch Micrometer No. 212



This attachment, by means of which a 2 inch micrometer may be instantly converted into a 1 inch tool, will be furnished, when ordered, with any of our 2 inch or 50 millimeter micrometers

PRICE.....\$2.00

U. S. Standard Metal Plate Micrometer and Weight Indicator No. 86



This tool is designed to measure and show the indicated weight of metal plate.

By it are shown the measure as fine as .1280 or $\frac{1}{80}$ of an inch up to 1 inch, and the weight from $\frac{1}{8}$ ounce up to 40 pounds, the standard weight for a plate 1 inch thick.

The numbers and figures on the frame, in connection with graduations upon stem and sleeve, will show the above results when read according to the directions sent with each indicator.

PRICE.....\$6.50
in Leather case..... 7.00

Sent with case unless otherwise ordered.

Half Inch Micrometers

No. 215

For measurement by thousandths up to one-half inch.
Has lock nut and ratchet stop.

PRICES

No. 215.....	\$5.00
In Leather case.....	5.50



No. 219

For measurement by ten thousandths up to one-half inch.

Has lock nut and ratchet stop.

PRICES

No. 219.....	\$6.00
In Leather case.....	6.50

Both No. 215 and No. 219 sent in case unless otherwise ordered.

Half Inch Micrometers

No. 216

For measurement by thousandths up to one half inch.

Has ratchet stop, but no lock nut.

PRICES

No. 216.....\$4.50
In Leather case..... 5.00



No. 218

For measurement by ten thousandths up to one half inch.

Has ratchet stop but no lock nut.

PRICES

No. 218.....\$5.50
In Leather case..... 6.00

Both No. 216 and No. 218 sent in case unless otherwise ordered.

Metric Micrometers, 25mm.

No. 3M

For measurement by hundredths of a millimeter up to twenty-five millimeters.
Has lock nut and ratchet stop.

PRICES

No. 3M.....\$6.00
In Leather case..... 6.50



No. 201M

For measurement by hundredths of a millimeter up to twenty-five millimeters.

Has lock nut but no ratchet stop.

PRICES

No. 201M.....\$5.50
In Leather case..... 6.00

Both No. 3M and No. 201M sent in case, unless otherwise ordered.

Metric Micrometers, 25mm.

No. 202M

For measurement by hundredths of a millimeter up to twenty-five millimeters. Has ratchet stop, but no lock nut.

PRICES

No. 202M	\$5.50
In Leather case	6.00



No.
203M
\$5.00

No.
203M

For measurement by hundredths of a millimeter up to twenty-five millimeters. Has neither lock nut nor ratchet stop.

PRICES

No. 203M	\$5.00
In Leather case	5.50

Both No. 202M and No. 203M sent in case unless otherwise ordered.

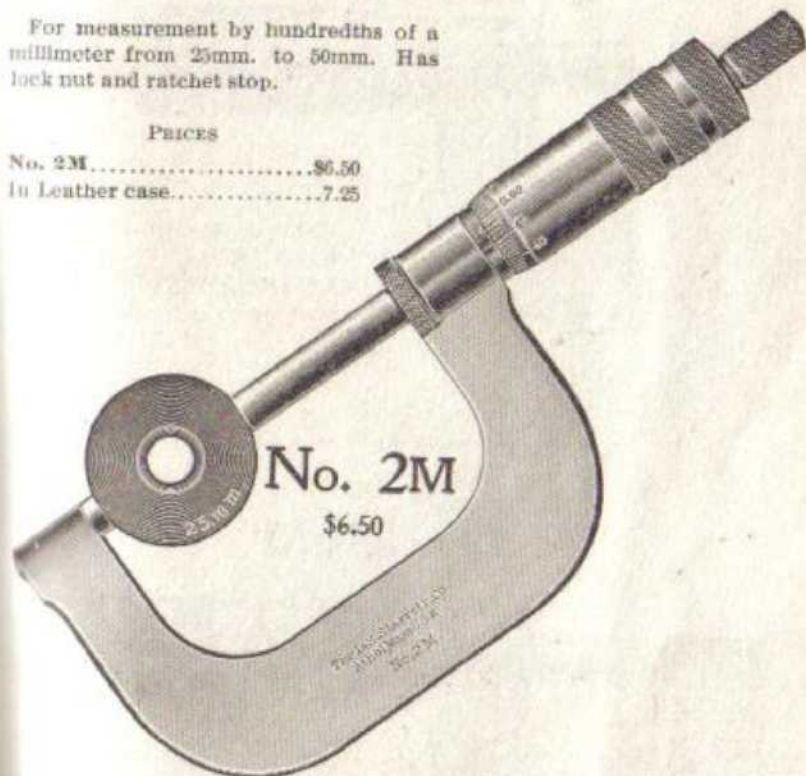
Metric Micrometers

No. 2M

For measurement by hundredths of a millimeter from 25mm. to 50mm. Has lock nut and ratchet stop.

PRICES

No. 2M.....\$6.50
In Leather case.....7.25



No. 217M

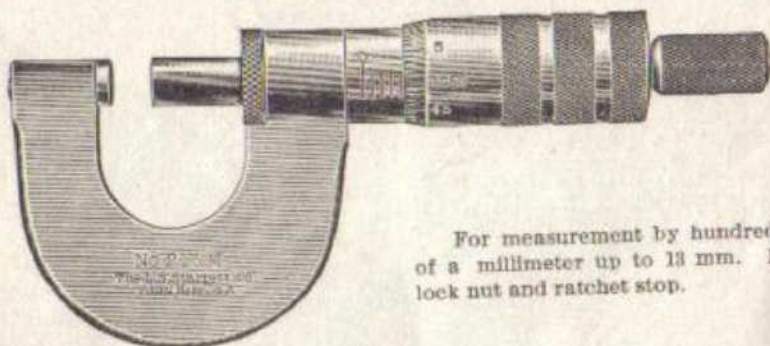
For measurement by hundredths of a millimeter from 25mm. to 50mm. Has lock nut, without ratchet stop.

PRICES

No. 217M.....\$6.00
In Leather case.....6.75

Both No. 2M and No. 217M sent in case unless otherwise ordered.
For No. 212 Attachment, see page 62.

Metric Micrometers No. 215M



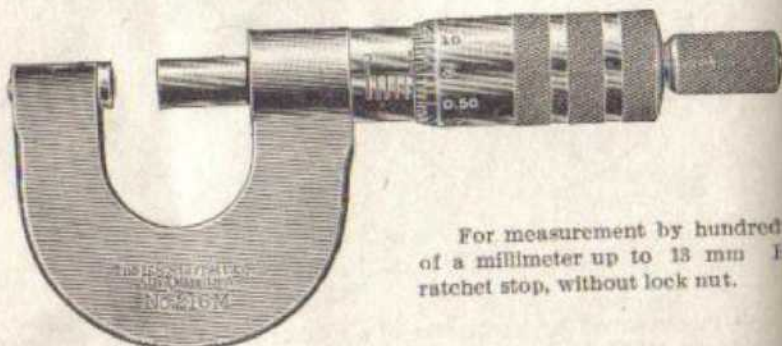
For measurement by hundredths of a millimeter up to 13 mm. Has lock nut and ratchet stop.

PRICES

No. 215M.....	\$5.00
In Leather case.....	5.50

Sent in case unless otherwise ordered.

No. 216M



For measurement by hundredths of a millimeter up to 13 mm. Has ratchet stop, without lock nut.

PRICES

No. 216M.....	\$4.50
In Leather case.....	5.00

Sent in case unless otherwise ordered.

For finger ring which may be applied to either No. 215M or No. 216M see page 54.

Micrometer Heads

English, One Inch

No. 263

The engraving is full size. These heads are easily attached to tools or machines when fine measurements are required. They have ratchet stops and lock nuts and are graduated to read to thousandths of an inch. They will be furnished without ratchet or lock nut when so desired.

PRICE.....\$3.50



Metric, 25 Millimeters

No. 263M

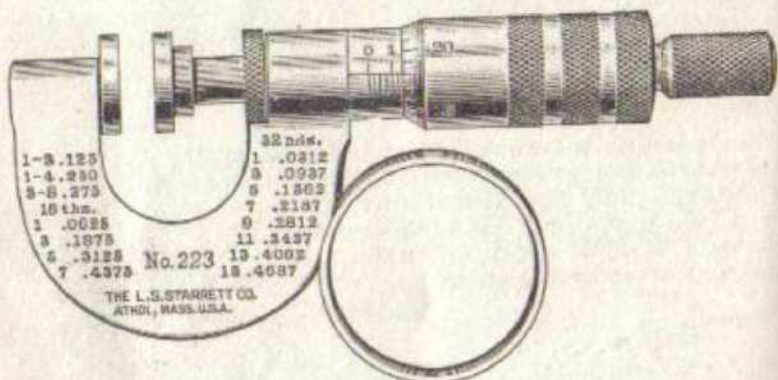
The same as No. 263, except that it is graduated for measurements by hundredths of a millimeter up to twenty-five millimeters.

PRICE.....\$3.50

Paper Gauge Micrometers

No. 223

With Ring



This micrometer is used in measuring the thickness of paper, sheet rubber, cardboard, etc. The discs are placed on the anvil and spindle so that measurements can be taken without compressing the articles measured. Measures all sizes less than $\frac{1}{16}$ of an inch by thousandths of an inch.

PRICES

Without ratchet stop and with ring, without case, \$6.25.....	With case, \$6.75
With	6.75..... 7.25

Sent with ratchet and case, unless otherwise ordered.

No. 223M

Same as above, only graduated to read in hundredths of a millimeter.

PRICES

Without ratchet stop and with ring, without case, \$5.25.....	With case, \$5.75
With	6.75..... 7.25

No. 225

Same as our No. 223, only without the ring attachment.

PRICES

Without ratchet stop, without case, \$5.50.....	With case, \$6.00
With	6.00..... 6.50

Sent with ratchet and case, unless otherwise ordered.

Paper Gauge Micrometer No. 225M

Same as our No. 225, only graduated to read to hundredths of a millimeter.

Prices

Without ratchet stop, without case, \$5.50	With case, \$6.00
With " " " " 6.00	" " " " 6.50

Sent with ratchet and case unless otherwise ordered.

Micrometer Sheet Metal Gauges



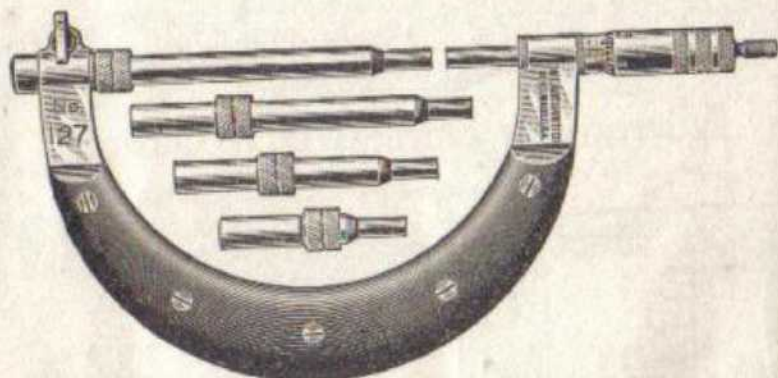
No. 222M

Name as No. 222, except graduated for measurements by hundredths of a millimeter.

Price.....	\$6.00
In Leather case*.....	6.75

Sent with case unless otherwise ordered.

United States Government Micrometer Gauges No. 127



These gauges were designed and made to meet the requirements of the Government in making big guns and other work in the Ordnance Department of Government shops, where they are now used. The frames are cut from steel plates, nicely finished. The sides are covered with hard rubber, put on with brass screws, preventing inaccuracy through expansion caused by change in temperature when held in warm hands. The micrometer screw adjusts one inch, reading $\frac{1}{1000}$ of an inch, and is provided with our patent lock nut. The different length tail spindles, forming anvils, are interchangeable and have positive stops to set against their socketed seats. The adjusting collars on these anvils have notches to facilitate the removal of dirt, which would prevent them from setting accurately against the seat. The contact ends of spindles are slightly convex, to prevent catching on cylindrical work. Furnished with ratchet stop or speeded screw thumb piece, as desired.

PRICES	
0 to 4 in	\$25.00
4 to 8 in	37.00
8 to 12 in	50.00

Furnished in oak case without extra charge.

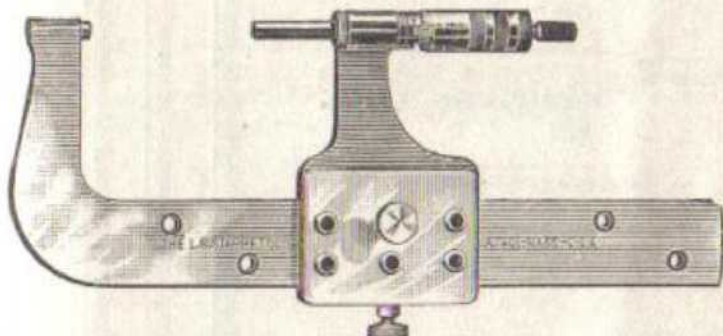
No. 127M

Same as above, only graduated in Metric, for measurements by hundredths of a millimeter.

PRICES	
0 to 100 mm	\$25.00
100 to 200 mm	37.00
200 to 300 mm	50.00

Patent Six Inch Micrometers

No. 128



This micrometer will measure round work to $4\frac{1}{4}$ inches, and flat work to 6 inches. It weighs 21 ounces, and is rigid and accurate. It can be quickly set to exact position, from 1 inch to 6 inches, by inserting a plug as shown. A valuable feature of this tool is a set of six independent holes through both the movable part and the beam, each hole being bushed with hardened steel bushings, ground and lapped to fit the plug, which locates to exactness the various inch settings.

PRICE.....	\$20.00
In Leatherette case.....	21.50

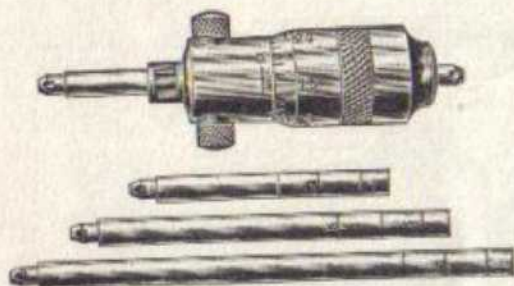
Sent in case unless otherwise ordered.

No. 128M

For measurement by hundredths of a millimeter to 15 cm. The holes are 35 mm. apart. Prices as above.

Inside Micrometers

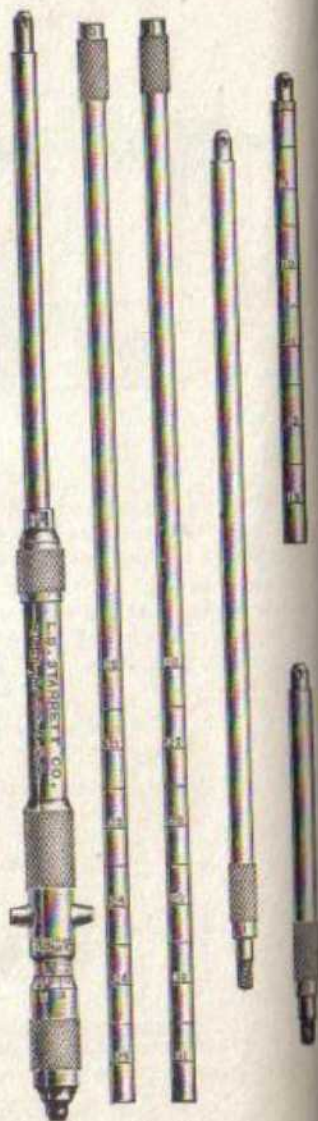
No. 120



SET A

Both have screw and nut same as our Improved No. 3 Micrometer Caliper and read in thousandths. Set A measures from 2 inches to 8 inches, has $\frac{1}{2}$ inch movement of screw and requires four extension rods. The rods are provided with a hardened steel adjustable anvil in ends, which permits adjusting for wear. A small binding screw locks rods when set. Rods are marked in $\frac{1}{2}$ inch divisions and set to a similar line on a projection of the barrel.

Set C is similar in all respects with the exception that it measures from 8 inches to 32 inches, with four extension rods, and has a lock for screw as well as rods; and has one inch movement of the screw. This is a very strong and serviceable tool as well as an accurate one. We can furnish rods of extra lengths for these tools when desired.



SET C

Inside Micrometers

No. 120—Continued

When so ordered an auxiliary handle accompanies Sets A, B, and D, which is used by removing the nut opposite the lock nut and screwing the handle in place of same, thereby enabling one to take measurements in holes and other places where the micrometer could not otherwise be used.

PRICES

Set A	With 4 rods, to measure from 2 to 8 inches, with case, \$4.75, without, \$4.00		
" B	" 7 " " " " 2 " 12 " " " 6.00, " 5.00		
" C	" 4 " " " " 8 " 32 " " " 7.25, " 5.75		
" D	Comprising sets A and C.....	" "	11.00, " 9.75
	Handle, extra.....		.50

Extra rods at 5 cents per inch.

Sent with case unless otherwise ordered.



HANDLE

No. 120M

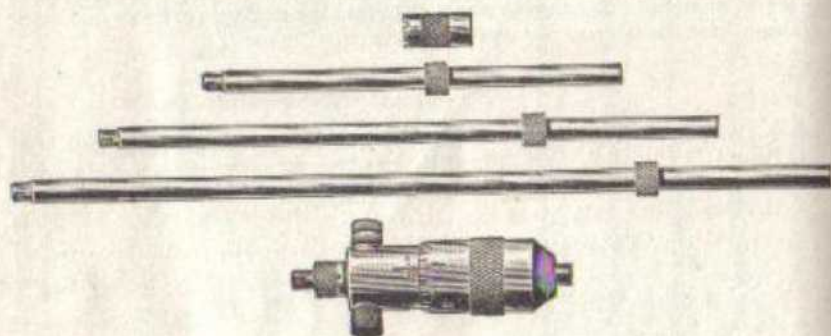
For measurement by hundredths of a millimeter.

PRICES

Set A	To measure from 5 cm. to 20 cm., with case, \$4.75, without.....	\$4.00
" B	" " " 5 " " 30 " " " 6.00, "	5.00
" C	" " " 20 " " 76 $\frac{1}{2}$ " " " 7.25, "	5.75
" D	Comprising sets A and C.....	" " 11.00, " 9.75
	Handle, extra.....	.50

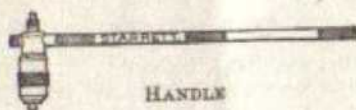
Inside Micrometer

No. 124



The above cut shows our new inside micrometer, No. 124, which, like our No. 120, is designed for internal and lineal measurements, such as measuring cylinders, rings; also for setting calipers, comparing gauges, etc. It is also useful in measuring parallel surfaces. The micrometer screw in the head has $\frac{1}{2}$ in. movement in sets A and B, one inch in set C, and, by means of the extension rods furnished, the sizes as given below for each set can be obtained. The extension rods are provided with a collar, against which the rods are conveniently and accurately set in the micrometer head. With the rods are sent standard gauges or rings to slip on the rods, under the collars, to further extend the rod. The contact surfaces are all hardened, and provision is made for adjustment, to compensate for wear of the screw and contact surfaces.

The auxiliary handle, as shown in cut, can be used with sets A, B and D.



HANDLE

The handle is screwed in the side of the micrometer head, in place of the knurled ear screw, which can be removed, thus fitting the tool for use in places too small for the hand. Handle is 50 cents extra.

Inside Micrometer

No. 124 — Continued

Set A has 6 rods and one $\frac{1}{4}$ -in. gauge, and measures from 2 in. to 8 in.

Set B has 10 rods and one $\frac{1}{4}$ -in. gauge, and measures from 2 in. to 12 in.

Set C has 4 rods and one 1-in. and two 2-in. gauges, and measures from 8 in. to 32 in.

Set D comprises sets A and C, and measures from 2 in. to 32 in.

No. 124M

Same as No. 124, except graduated in Metric. Micrometer reads in hundredths of a millimeter.

Set A has 6 rods and one 12 mm. gauge, and measures from 50 mm. to 200 mm.

Set B has 10 rods and one 12 mm. gauge, and measures from 50 mm. to 300 mm.

Set C has 4 rods and one 25 mm. and two 50 mm. gauges, and measures from 200 mm. to 800 mm.

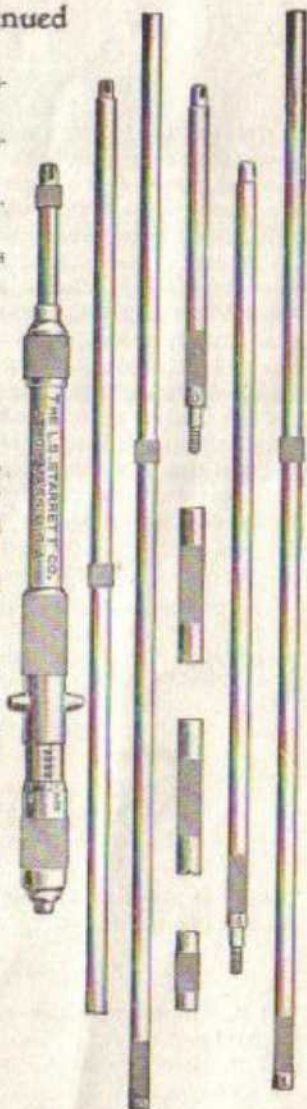
Set D comprises sets A and C, and measures from 50 mm. to 800 mm.

PRICES No. 124 AND No. 124M

Set A, without case,	\$4.50.....	With case,	\$5.25
Set B, " "	5.50.....	" "	6.50
Set C, " "	6.50.....	" "	8.00
Set D, " "	11.00.....	" "	12.50

Handle 50 cents extra.

Sent with case, unless otherwise ordered.



Set C.



HANDLE

Inside Micrometers

No. 121

This tool has one inch screw micrometer movement, connected with sleeve $\frac{1}{2}$ inch diameter, attached to a finely finished nickel plated steel tube $\frac{1}{2}$ inch diameter, 28 inch long. This telescopes extension tubes of various lengths, $\frac{1}{2}$ inch diameter. These tubes are accurately graduated and figured in inches and set to the inch marks, showing length wanted, and are firmly held by a knurled locking nut. The ends of rods have hardened steel anvils. The long rods are made to couple together, neatly, accurately and firmly, as if but one piece. The tool was designed for and is largely used by the Government in Navy Yards and Arsenals. An oak case is furnished with each set.

PRICES

Set A.	Stock with one rod, 32 to 57 in.	\$25.00
" B.	" " two rods, 32 to 82 "	30.00
" C.	" " three " 32 to 107 "	35.00

No. 121M

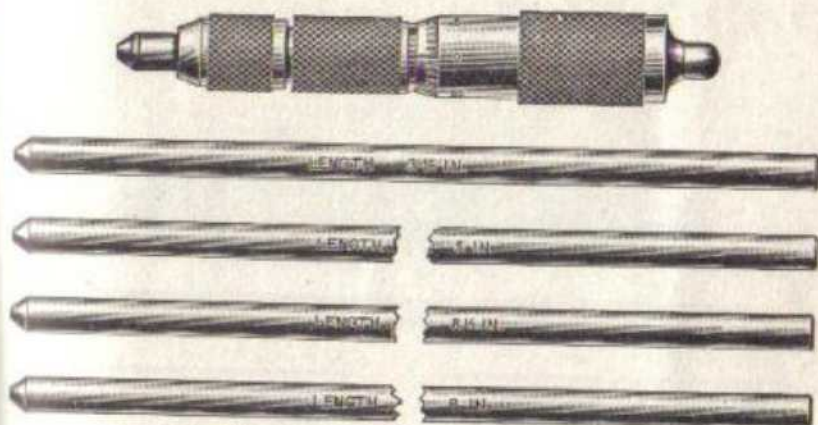
Same as above except made to read in hundredths of a millimeter.

PRICES

Set A.	Stock with one rod, 800 mm. to 1440 mm.	\$25.00
Set B.	Stock with two rods, 800 mm. to 2070 mm.	\$30.00
Set C.	Stock with three rods, 800 mm. to 2700 mm.	\$35.00



Micrometer Caliper Gauges No. 126



Designed for close internal measurements, indicating thousandths where a definite distance in inches is not essential. The body of the tool is a steel tube, provided at one end with a binding chuck in which are fastened the plain rods, and it can quickly be adjusted to any approximate size. The other end has sleeve and body of barrel marked and graduated same as our No. 3 Micrometer Caliper, giving a reading in thousandths, and has $\frac{1}{2}$ inch movement of screw. Anvil in end of sleeve is hardened, as are those in ends of rods.

PRICES

Capacity $2\frac{1}{2}$ inch to 10 inch (with five rods).....	\$2.00
In Leatherette case.....	2.75

Extra rods at 2 cents per inch.

Sent without case unless otherwise ordered.

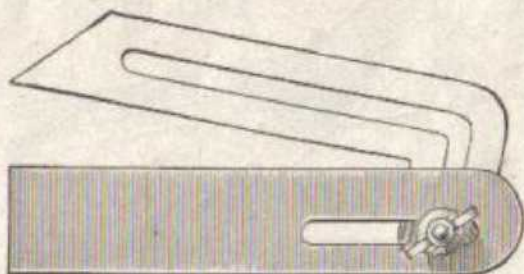
No. 126M

Metric

PRICES

Capacity 7 cm. to 25 cm.....	\$2.00
In Leatherette case.....	2.75

Universal Bevel No. 15

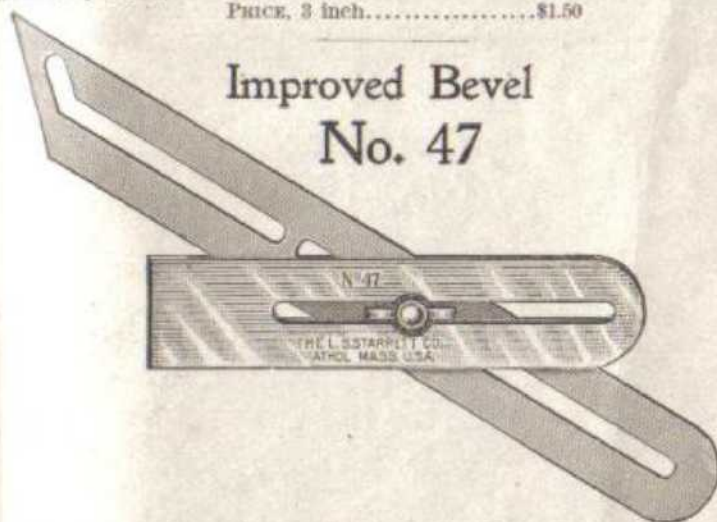


Improved features. The set-off in the blade increases its capacity and usefulness for bevel gear work, etc., so that any angle, however slight, may be obtained.

Another valuable feature is, one edge of the case being solid, a rest is formed directly under the blade, where thin templets may be placed and accurately fitted.

PRICE, 3 inch.....\$1.50

Improved Bevel No. 47

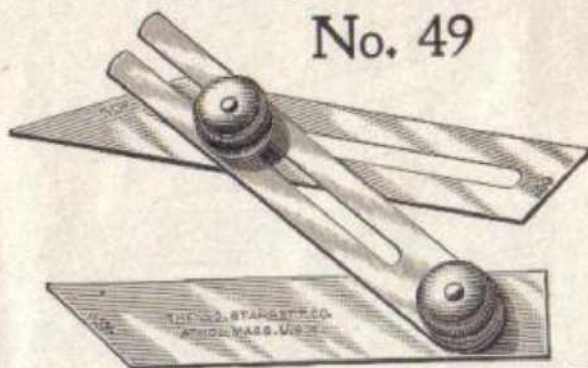


The advantages of this bevel over any other tool of this kind made, consist in its having not only the blade slotted but the stock as well, through and through, thus admitting adjustments that cannot be obtained with a common bevel. The clamping screw head, which the cut does not show, is let into a rabbet, flush with the surface of the stock, which will lie flat on the work.

PRICES

6 inch (length of stock $3\frac{1}{4}$ in.)	\$1.25
9 " " " " " "	1.50
12 " " " " " "	1.75

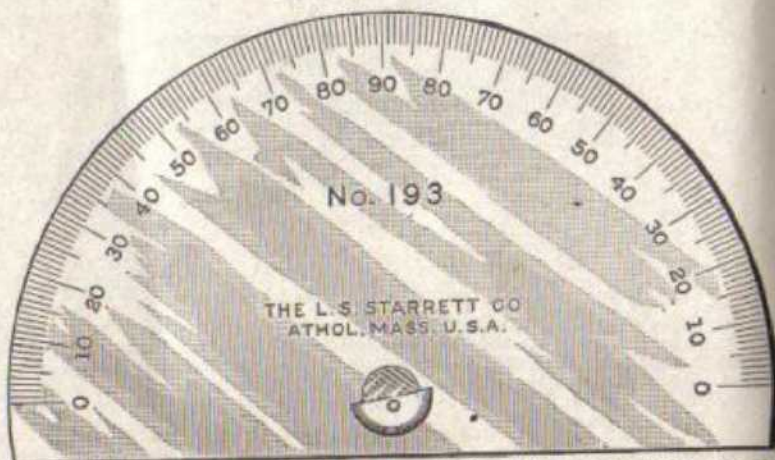
Combination Bevel No. 49



This bevel has a stud riveted in the straight edge stock or head, on which its split blade is hinged, so as to swing over the stock, and be clamped at any angle. The slotted auxiliary blade with clamp bolt may be slipped on to the split blade and be clamped at any desired angle and used, in combination with the stock of the other, for laying out work, measuring, or showing any angle desired, and, when so combined, will lie flat upon its work. The stock is about 4 inches long.

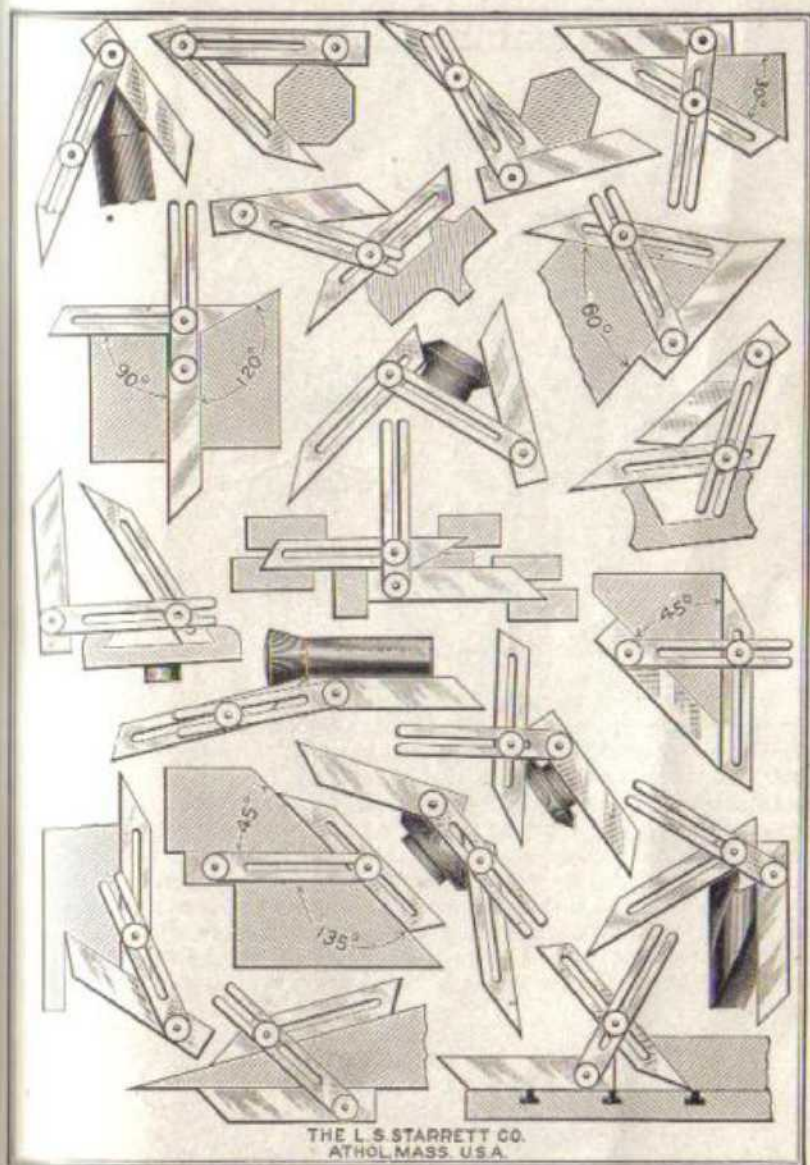
PRICE.....\$2.00

Protractor No. 193



Used for setting bevels No. 15, No. 47 and No. 49 at any desired angle, thus converting them into Bevel Protractors at slight cost.

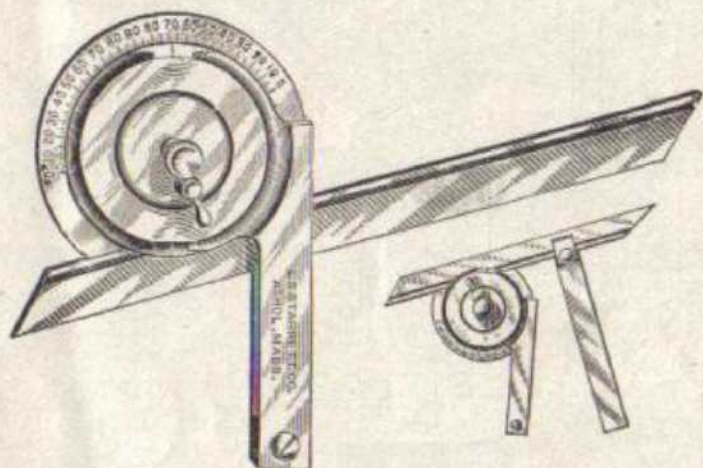
PRICE.....\$1.00



Showing some of the many uses of
No. 49 Combination Bevel

Universal Bevel Protractor

No. 360



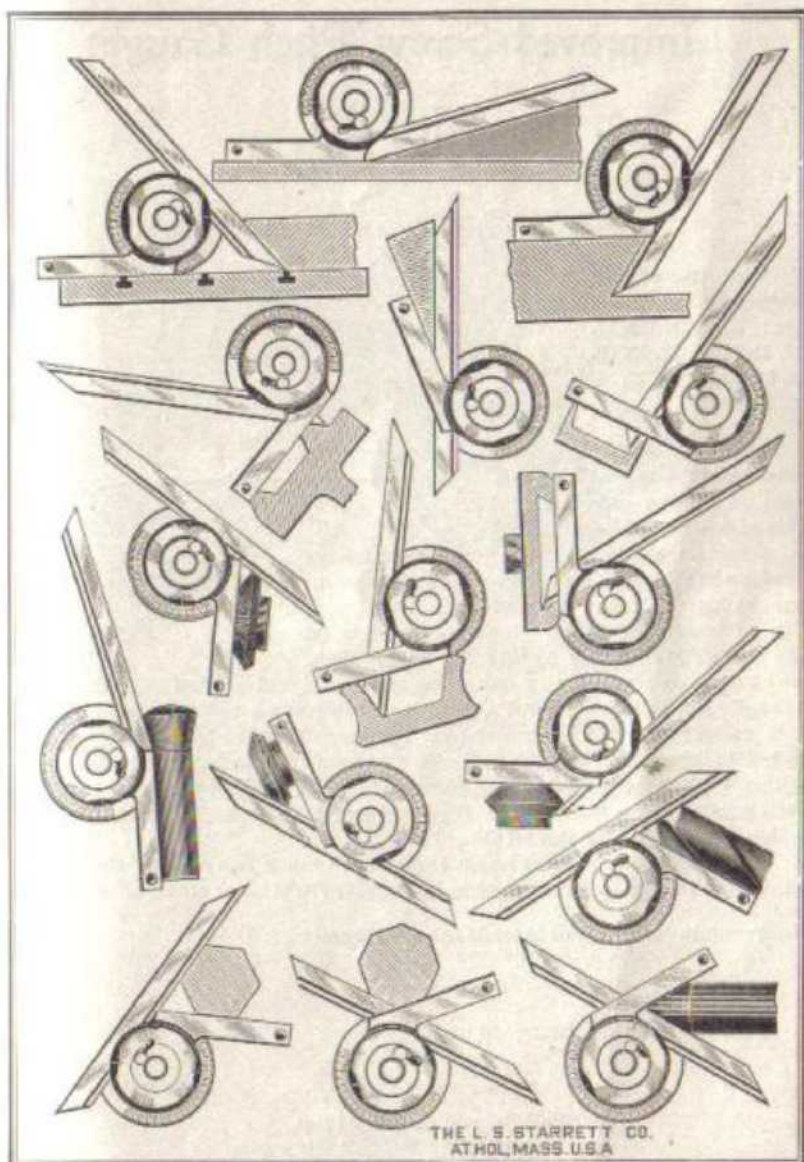
This tool weighs six ounces. The blade is either 7 or 12 inches by $\frac{1}{4}$ inch, the stock 4 inches long, and both are made from sheet steel, nicely finished. The disc is graduated in degrees from 0 to 90 each way, and rotates the entire circle on a central stud inside the case. The blade (clamped by an eccentric stud against the edge of the disc) may be slipped back and forth its full length, or turned at any angle around the circle and firmly clamped at any point, adapting it for work in positions where others cannot be used, and rendering the common universal bevel (for transferring angles) unnecessary. One side of the stock being flat, makes it a convenient tool for laying on paper in drafting, etc., and it has double the utility of any other tool of the kind.

The attachment shown in the smaller engraving will be found very convenient for grinding worm thread tools, tapers on lathe centers, and all long tapers.

PRICES

7 inch.....	\$5.00
7 " in Leatherette case.....	5.75
12 "	6.00
12 " in Leatherette case.....	7.00
With both 7 and 12 inch blades.....	6.50
Same in Leatherette case.....	7.50
Attachment, extra.....	1.00

All sent in case unless otherwise ordered.



Showing a few of the various uses of
No. 360 Universal Bevel Protractor

Improved Screw Pitch Gauge No. 40

This gauge has twenty-two pitches, viz.: 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40.

This gauge can be used inside a nut as well as on the outside of a screw or bolt.

A late improvement in our Screw Pitch Gauge consists in stamping on each leaf decimals showing the double depth of thread on said leaf, and this of course equals the depth of threads on the two sides of a tap having the same pitch, and helps the workman to determine the size of drill needed to drill the hole the right size to leave a full V thread for a tap having the same pitch. To do this, caliper with a micrometer over the threads of the tap and from its size in 1,000ths shown, deduct the decimals given on the pitch gauge leaf, agreeing with the pitch of the tap. The result will show in thousandths the size of drill needed for a full thread. An allowance is to be made for the extent to which it is desired the thread should be flattened.

A further improvement has recently been made in reducing the width of the leaves having the finer pitches, so that they will enter small nuts.

Formula for depth of threads for a V thread :

$$d = D - \frac{1.733}{N}$$

Formula for U. S. Standard :

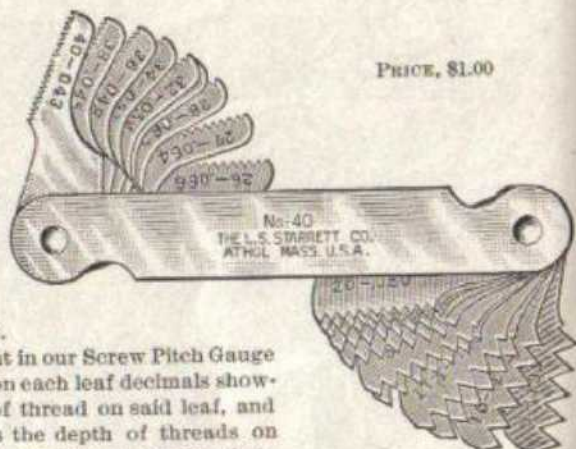
$$d = D - \frac{1.299}{N}$$

D=Outside diameter of tap.

d=Bottom " " "

N=Number of threads per inch.

PRICE, \$1.00

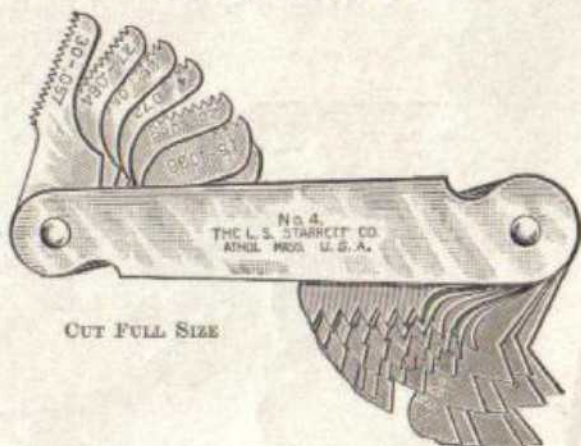


NOTE.—The gauge formerly listed as No. 11½ is no longer made, the 11½ and 27 pitches being added to the No. 40 gauge described above.

Screw Pitch Gauges

No. 4

24 Pitches, 4 to 30



Has the following pitches: 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30. The teeth are sharp and clean cut. Like our No. 40 it can be used inside of a nut as well as on outside of a screw or bolt. It is also a convenient and reliable tool to use as a 60-degree center gauge and gauge to test the grinding of either an inside or outside threading tool.

PRICE.....\$1.25

No. 5

26 Pitches, 32 to 82

Of the same form as our No. 40 Screw Pitch Gauge, for inside and outside work. Has the following pitches: 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82.

PRICE.....\$1.25

No. 6

30 Pitches, 4 to 42

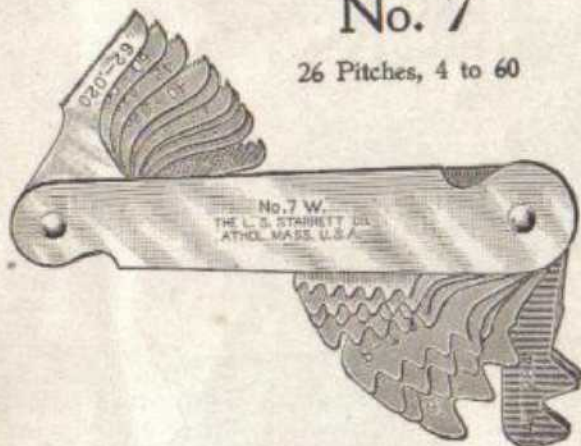
Of the same form as our No. 4 Screw Pitch Gauge. Has the following pitches: 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42.

PRICE.....\$1.50

Whitworth Screw Pitch Gauge

No. 7

26 Pitches, 4 to 60



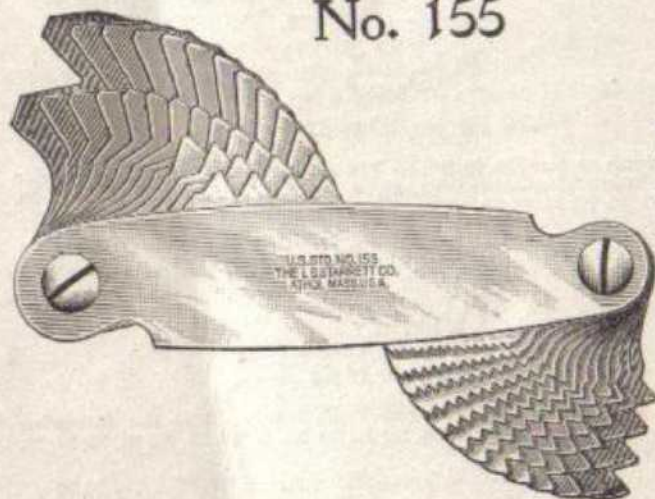
Has the following pitches: 4, 4½, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 40, 48, 60.

PRICE.....\$1.25

For Whitworth Standard Thread only

U. S. Standard Screw Pitch Gauge

No. 155



This gauge has 25 pitches, viz.: 2½, 2½, 2½, 2½, 2½, 2½, 3, 3½, 3½, 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20.

Also a center gauge with coarse and fine notch.

PRICE, \$1.50

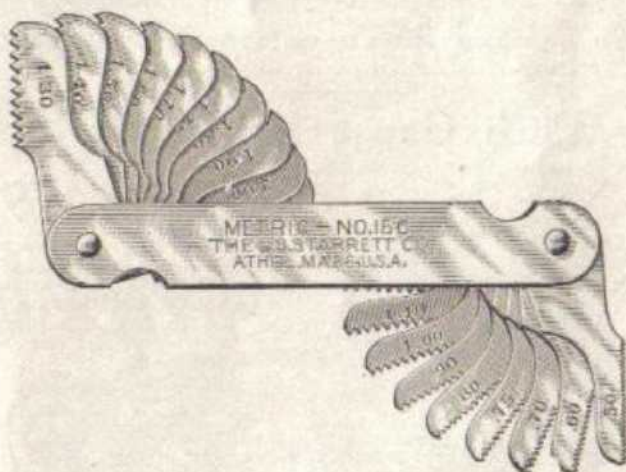
Bicycle Screw Pitch Gauge No. 157

Has 22 pitches. Similar in design to No. 40. It is made for the use of bicycle manufacturers, electricians, and others using screws with fine V threads. It has the following pitches: 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74.

PRICE.....\$1.00

Metric Screw Pitch Gauge No. 156

20 Pitches, .50 to 2.50



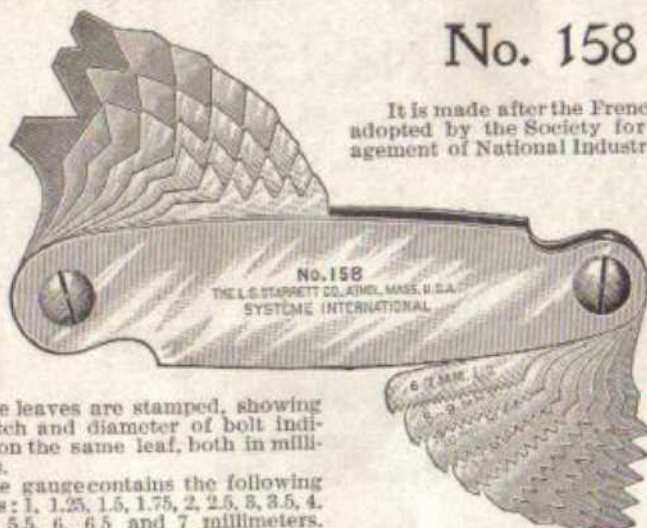
This gauge is similar in design to our No. 40, with V thread.

The base of this system is one millimeter, and the blades are stamped with the pitch or the distance from the center of one tooth to the center of the next expressed in millimeters or fractional parts thereof. The tool contains blades of the following pitches: .50, .60, .70, .75, .80, .90, 1.00, 1.10, 1.20, 1.25, 1.30, 1.40, 1.50, 1.60, 1.70, 1.75, 1.80, 1.90, 2.00, 2.50; that is from $\frac{1}{2}$ millimeter up to 2 $\frac{1}{2}$ millimeters.

PRICE.....\$1.00

International Standard Screw Pitch Gauge No. 158

It is made after the French system adopted by the Society for Encouragement of National Industries.



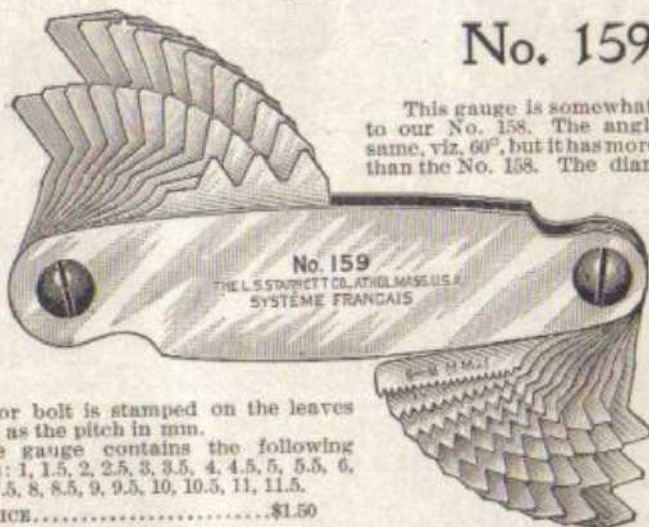
The leaves are stamped, showing the pitch and diameter of bolt indicated on the same leaf, both in millimeters.

The gauge contains the following pitches: 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5 and 7 millimeters. This gauge also contains a center gauge with coarse and fine notches, for use in grinding thread tools

PRICE.....\$1.00

Screw Pitch Gauge for Metric System No. 159

This gauge is somewhat similar to our No. 158. The angle is the same, viz, 60°, but it has more pitches than the No. 158. The diameter of



screw or bolt is stamped on the leaves as well as the pitch in mm.

The gauge contains the following pitches: 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 10.5, 11, 11.5.

PRICE.....\$1.50

Thickness Gauge or "Feeler"

No. 72

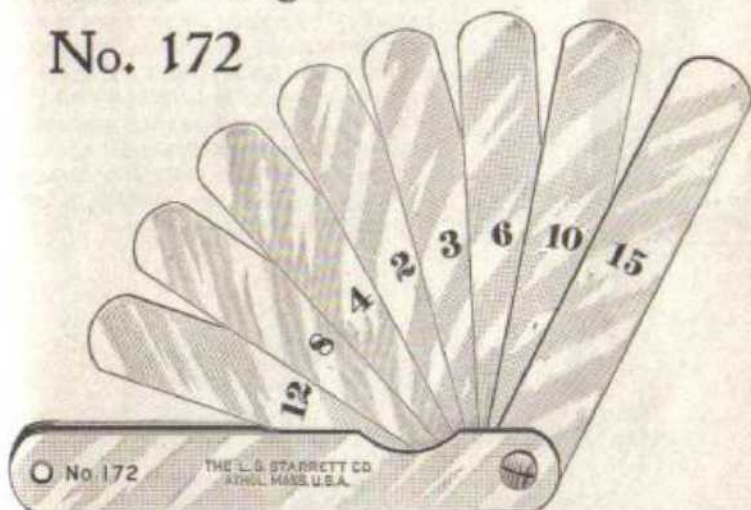


This gauge has 22 leaves, varying in thickness by thousandths, running from .004 to .025. The thickness of each leaf is designated by the number upon it. Each leaf may be used singly or in combination with others, and any thickness in thousandths within their limits may be quickly obtained. The leaves fold within the case, which is 2½ inches long, a convenient size to carry in the pocket.

PRICE....\$1.50

Thickness Gauge

No. 172



This gauge has 8 leaves, viz., .002, .003, .004, .006, .008, .010, .012, .015. The leaves are *tempered*, and have the thickness marked upon them. Size of case, 3½ in. long, ½ in. wide; leaves 3½ in. long, ½ in. wide.

PRICE.....\$1.00

Patent Micrometer Depth Gauge

No. 446



This gauge is designed for measuring the depth of grooves, holes or irregular parts. It has $\frac{1}{2}$ inch movement of the screw, reading in thousandths; and with two $\frac{1}{4}$ inch and one 1 inch standard collars to slip off or on the spindle, $2\frac{1}{4}$ inches, reading in thousandths, can be obtained. The split nut is covered and protected by our patent graduated sleeve, which not only protects the nut from dirt, but provides a quick and accurate way of taking up wear and adjusting the micrometer to insure correct reading. The sleeve, being held by a stiff friction, may be rotated by a spanner wrench, accompanying each gauge, so that the zero lines will coincide for correct reading. The head is about $\frac{1}{8}$ inch thick and $2\frac{1}{4}$ inches long; this and the point of measuring rod are hardened.

The head carries with it a knurled set screw for locking the spindle, to prevent changing after being set.

PRICE

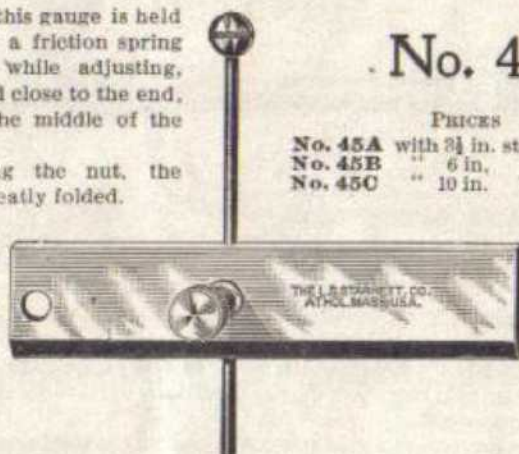
Without case.....	\$4.50
With ".....	5.00

Sent with case unless otherwise ordered.

Depth Gauges

The wire in this gauge is held to a groove by a friction spring inside the nut while adjusting, and may be used close to the end, as well as in the middle of the straight edge.

By loosening the nut, the gauge may be neatly folded.

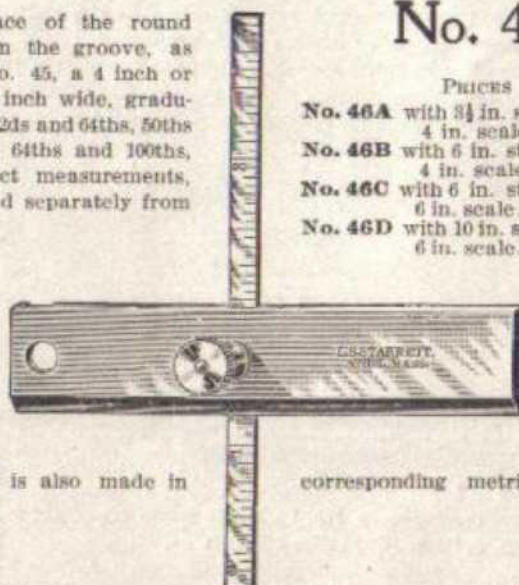


No. 45

PRICES

No. 45A	with 3½ in. stock....	\$0.75
No. 45B	" 6 in. "	1.15
No. 45C	" 10 in. "	1.35

Has in place of the round wire to slide in the groove, as shown with No. 45, a 4 inch or 6 inch scale, $\frac{1}{8}$ inch wide, graduated in either 32ds and 64ths, 50ths and 100ths, or 64ths and 100ths, indicating exact measurements, and may be used separately from the gauge.



No. 46

PRICES

No. 46A	with 3½ in. stock and 4 in. scale.....	\$1.25
No. 46B	with 6 in. stock and 4 in. scale.....	1.50
No. 46C	with 6 in. stock and 6 in. scale.....	1.75
No. 46D	with 10 in. stock and 6 in. scale.....	2.25

This gauge is also made in above prices.

corresponding metric sizes at

Patent Inspector's Gauge No. 30



This gauge was designed at the suggestion of a government inspector that there was no tool or instrument made suited for their needs for measuring the thickness of ship plates, boiler plates, etc., where measure had to be taken through a bolt hole, or hole drilled for the purpose.

The cut shows the shape of the hook end when inserted through a hole. The contact point is carried in beyond any burr formed by drilling, insuring correct measurement.

The slide measuring rod is graduated on two opposite sides, one side reading 32ds, the other 40ths. Reading from the top of the knurled friction slide, which, after the contact ends of the gauge are brought together against the thing being measured, is slipped down against the top, the graduations above it show the exact measure. Then the measuring rod may be instantly withdrawn, the hook part removed and all taken to the light and the correct measure indicated above the friction slide easily read.

The knurled nut over the split hub serves to contract same to fit close on the slide or to lock firm, making a solid gauge, convenient for any mechanic.

The gauge weighs about 1 ounce and is adapted for the vest pocket. Width, 1 inch. Capacity, $1\frac{1}{8}$ inch.

PRICE.....\$2.00

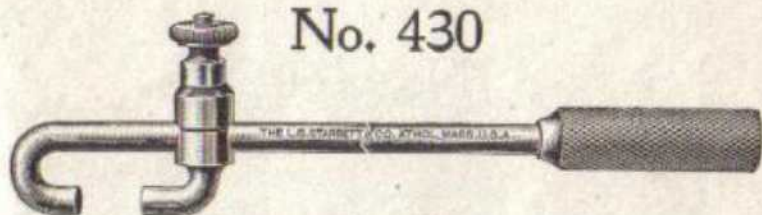
No. 31



This gauge is similar to No. 30, but is made narrower for use in smaller holes. Width, $\frac{7}{16}$ inch. Capacity, $1\frac{1}{8}$ inch.

PRICE.....\$2.00

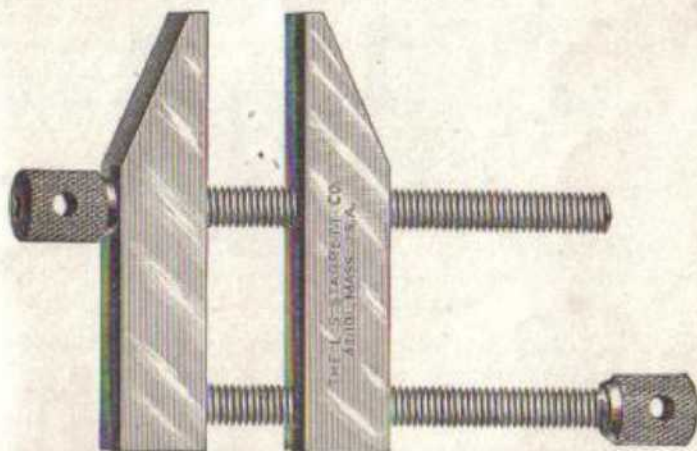
Hub Gauge No. 430



This gauge is used for measuring the length of pulley hubs, wagon wheel hubs, thickness of iron plate through holes, etc. The gauge will measure all lengths to $7\frac{1}{2}$ inches, and can be inserted through a $\frac{1}{2}$ inch hole.

PRICE\$1.50

Tool Makers' Parallel Clamps No. 161



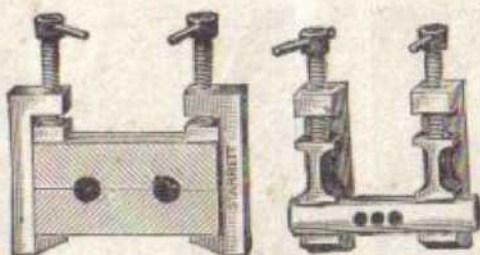
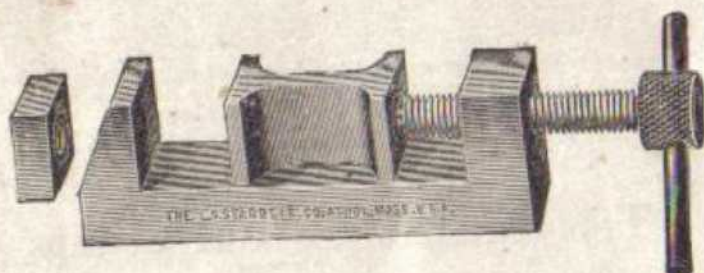
These clamps are made of steel, case hardened, and are very useful for holding small work together, in tapping, drilling, etc.

PRICES		
Size	Length of Jaw	Per Pair
$1\frac{1}{4}$ inch	2 inch	\$1.25
$1\frac{1}{2}$ "	$2\frac{1}{2}$ "	1.50
$2\frac{1}{4}$ "	3 "	1.75
$2\frac{1}{2}$ "	4 "	2.00

The sizes refer to opening of jaws.

Tool Makers' Steel Clamps

No. 160



These clamps are made from drop forgings, nicely finished, casehardened, and have take-up blocks to slip on and off end of screw, and are held to same in a novel manner. They will hold work square and parallel for laying out on surface plates, fitting or drilling. A round piece may be rigidly held in two of the clamps and drilled on an upright, central and parallel. Put up and sold in pairs. With the small block in use, the capacity of the smaller clamp is a little over one inch, and that of the larger clamp two inches.

PRICES

1 inch (per pair).....	\$1.00
2 " " ".....	1.25

Little Giant Jack Screws



These are designed for tool-room use, for leveling up work on a planer-bed or under an upright drill, setting-up machinery, etc. All parts are case-hardened.

No. 190 The Jack (A) is $1\frac{1}{2}$ inch diameter at the base and has a range from $2\frac{1}{4}$ to $3\frac{1}{2}$ inches. It will raise 1,000 pounds or more. Two extension bases (B and C) are made to fit the base of the main part (A) and are 2 and 1 inch high respectively. With these two extensions used singly or together a reach from $2\frac{1}{4}$ to $6\frac{1}{4}$ inches may be obtained.

An auxiliary pointed screw (D) is supplied to be used in place of the screw with swivel cap in certain places where it may be preferable. The base (E) is also provided, for use in cases where such a shape may be desirable.

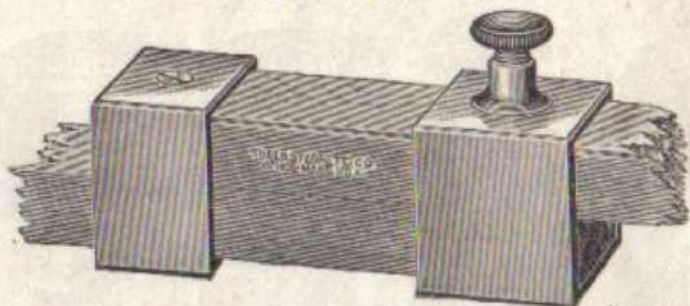
No. 191 A smaller size is made, 1 inch diameter. Part A, $1\frac{1}{2}$ inch high; B, 1 inch; and C, $\frac{1}{2}$ inch. With this size, adjustments from $1\frac{1}{2}$ to $3\frac{1}{2}$ inches are obtainable.

PRICES (For either the No. 190 or No. 191)

Jack (A).....	\$0.75
Extension Base (B).....	.20
Extension Base (C).....	.15
Extension Base (E).....	.15
Extra Screw (D).....	.15
Jack, with all Attachments.....	1.40

Sent complete (\$1.40) unless otherwise ordered.

Measuring Bar Clamps No. 69



These clamps are one inch square inside, and are to be used with two wooden bars about 1 in. by $\frac{1}{2}$ in. of any desired length. The clamps and bars thus combined will be found very convenient by carpenters as adjustable measuring rods, as well as for extension beams for our No. 59 Trammels. Nickel plated.

Price, per pair.....\$0.50

Rule Clamps No. 299



This little tool is used to clamp two steel rules together, end to end, making one long rule. The rules may be of the same or different widths up to $1\frac{1}{2}$ in. This clamp will be of special value to mechanics, whose tool chests will usually not hold rules longer than 12 in.

Price\$0.50



Mercury Plumb Bobs

No. 87

These plumb bobs are made from solid steel bored and filled with mercury. Noteworthy features are their great weight in proportion to size, low center of gravity, small diameter, hardened and ground points, knurling on body, and the simple and effective device at top for fastening end of line after winding up. Each is provided with a braided silk line. Nickel plated.



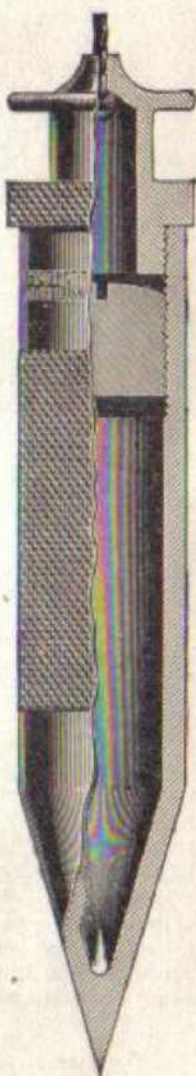
PRICES

4 in. long.	$\frac{1}{2}$ in. diam.	$3\frac{1}{2}$ oz.	.....	\$1.00
5 " "	$\frac{5}{8}$ " "	6 " "	.....	1.50
$5\frac{1}{2}$ " "	$\frac{7}{8}$ " "	12 " "	.....	2.00
6 " "	1 " "	16 " "	.....	2.50

Steel Plumb Bobs

No. 177

The same in design as No. 87, but made from solid steel, the mercury being omitted.

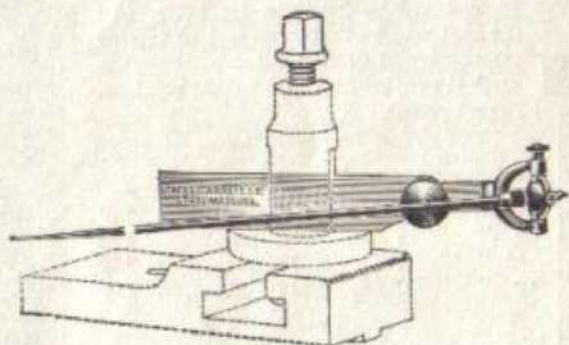


PRICES

4 in. long.	$\frac{1}{2}$ in. diam.	$2\frac{1}{2}$ oz.	.....	\$0.75
5 " "	$\frac{5}{8}$ " "	5 " "	.....	1.00
$5\frac{1}{2}$ " "	$\frac{7}{8}$ " "	$8\frac{1}{2}$ " "	.....	1.50
6 " "	1 " "	$14\frac{1}{2}$ " "	.....	2.00

Center Tester

No. 65

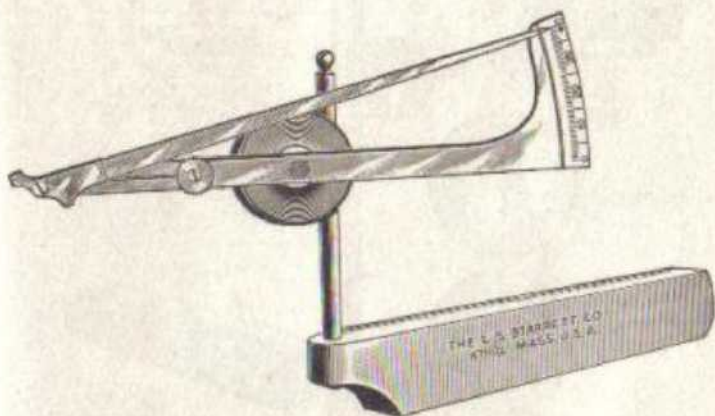


This instrument was designed to use in adjusting and locating centrally any point or hole in a piece of work operated upon in a lathe chuck or on a face-plate; also to test the truth of lathe centers or a shaft between the centers, the instrument being held in the tool post.

The tester is of improved design and nicely made. The indicating needle passes through the ball, having a split stem, forming a chuck for holding the needle adjusted to any desired length. The ball is pivoted to form a universal joint, but may be instantly converted into a single joint for a tilting motion by only tightening the knurled nut, adapting it for both inside and outside surface contact. A steel bead, not shown in the cut, and carried on the needle, slips over the point of same when used for inside work. The instrument is joined to a tool-post shank by a flexible steel ribbon with sufficient spring to properly hold the needle in contact with the work. It is a tool needed in every up-to-date tool room.

PRICE.....\$2.50

Universal Test Indicator No. 64



The above indicator is a much needed instrument. It may be used to test and show the imperfections or truth of inside, outside or surface work. It can be instantly attached to the spindle or to the needle of any surface gauge

and used in connection with same to show the slightest variation in thousandths. It may be clamped to a flat or round support, varying in size from a surface gauge needle up to $\frac{1}{2}$ in., flat or round. A special holder, as shown in cut, is designed to go in the tool-post of a lathe, adapting it for use to show the accuracy of all sorts of lathe work, turning, chucking, or locating and centering work on face plate. The head of the needle has three working points, equal distance from its fulcrum, so the telltale needle will vibrate, reading in thousandths, when work is in contact with either point—in front, above or below it. When in front, the spring operating the telltale needle needs to be reversed to throw point of needle up instead of down as when used above or below the work. This may be instantly

done by a slight turn of the disc to which the vibrating spring is attached. The working parts of the head are hardened and, as a surface or test gauge, no mechanic who is required to do accurate work can afford to be without it.

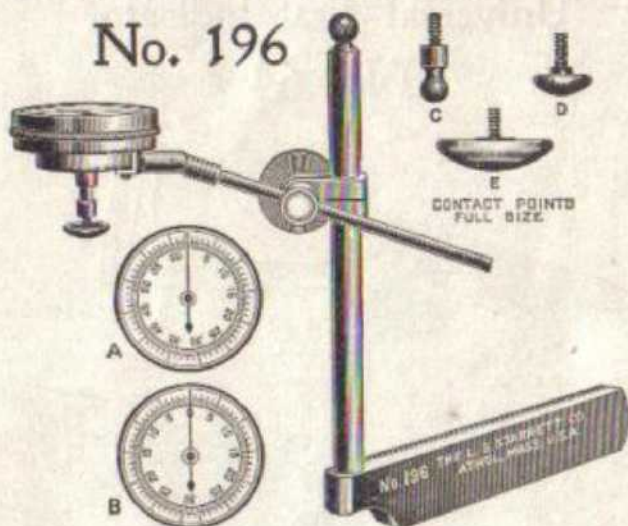
PRICES

Indicator only.....	\$2.50
Tool-Post Holder.....	.50
Indicator, with Tool-Post Holder, complete	2.75

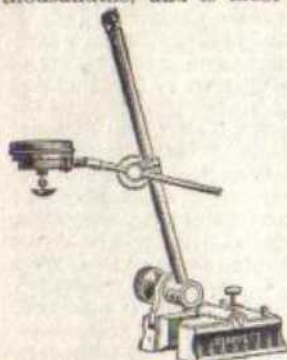
Sent complete unless otherwise ordered.

Consult pages 111-114 for Surface Gauges, to any of which the Indicator may be attached.

Universal Dial Test Indicator No. 196



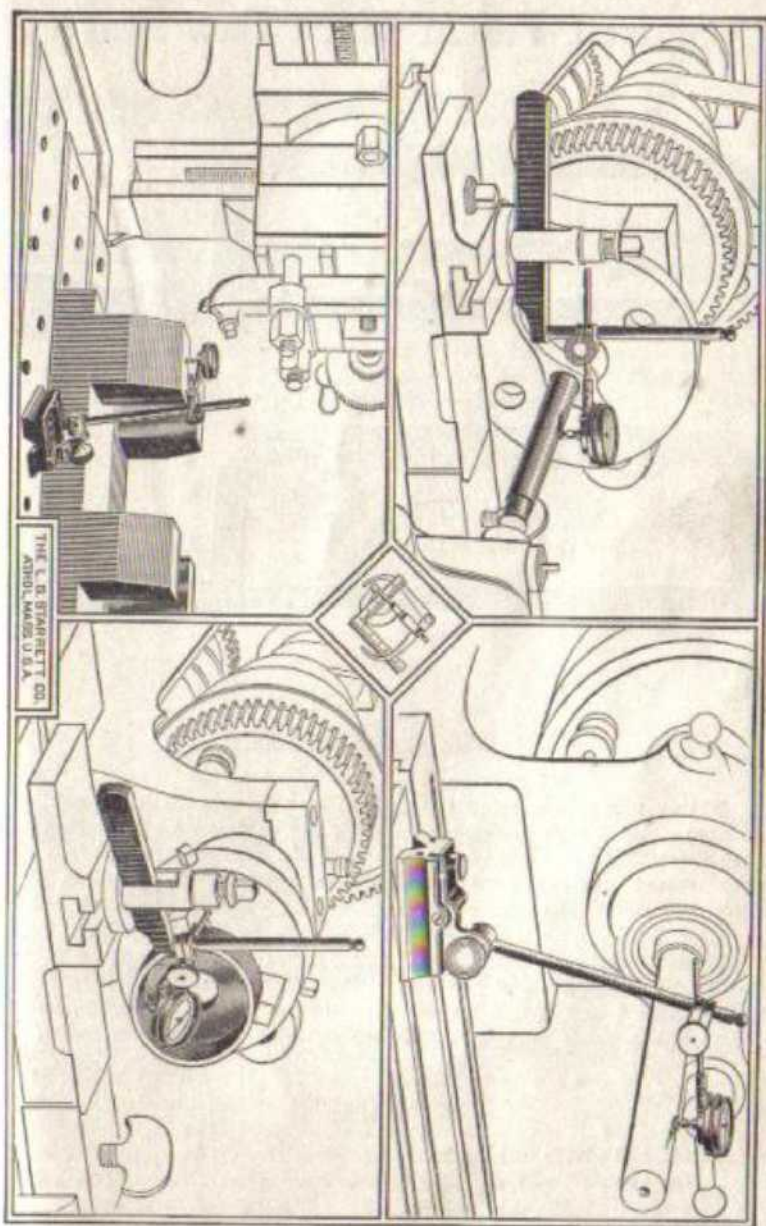
This indicator is simple, reliable, easily read and very sensitive. The slightest pressure upon the contact point produces a movement of the hand on the dial. The circumference of the dial is divided into 125 equal spaces, each one representing a movement of the contact point of one-half thousandth of an inch. One revolution of the hand therefore indicates $\frac{1}{2}$ inch, and two revolutions $\frac{1}{2}$ inch, which is the capacity of the instrument. The dials are figured in two different ways. Style A is marked from 0 to 62.5, the figures denoting thousandths, and is most useful in greater forward movement, measuring, indexing, spacing, etc. Style B is marked from 0 to 31.25 to right and left, and is best for general use.



By bringing contact point against the work with just enough pressure to give the hand one full turn, then setting it at 0, an opportunity is given for one full revolution of the hand to both right and left of 0, showing a rise or drop in the work and the amount of variation. A most valuable feature is the adjustable dial. By turning the knurled rim the dial may be instantly moved to bring the 0 mark to any point desired in relation to the hand. Each indicator is fitted with friction joint and removable $\frac{3}{8}$ inch rod, adapting it for use in any position, at the top, bottom or side of work, also with three hardened and ground contact points adapted for different classes of work. The special tool post and sleeve as shown above are useful in lathe work. For general work the indicator is adapted for use with our 9 inch or 12 inch surface gauges. On lathe, planer, milling machine and in setting up machinery, this tool will be thought indispensable when once used.

PRICES

Indicator, A or B, with three contact points, each.....	\$7.00
Tool post, extra.....	.50
Surface gauge sleeve, extra.....	.75
Extra contact points, each.....	.10



A Few Applications of No. 196 Test Indicator.

Starrett Patent Hack Saw Frames



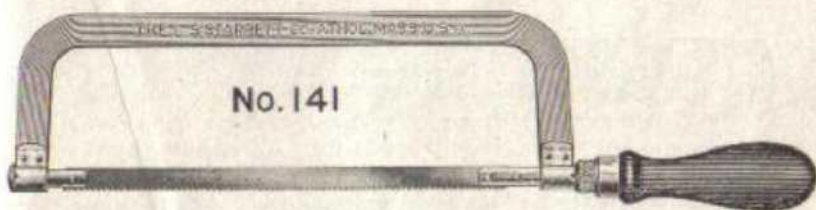
With Cocobolo Handles

Spring plungers overlap the ends of the saw, automatically holding it to its home. By slightly pushing them back the saw may be *instantly* removed, thus furnishing the most convenient way of attaching or detaching the saw ever devised. An improved nut within the handle, turning with it, gives the desired tension to the saw, which may be quickly and conveniently set at any required angle. The adjustable or extension back frames have improved spring pawls which securely hold the frames to receive saws of various lengths. The frames are neither too light nor too heavy — just right — are finely finished and nickel plated. In appearance, workmanship, and utility these tools are not approached by any other hack saw frames made.

PRICES

No. 140	With one blade.....	\$0.90
No. 145	" " "	1.25

Hack Saw Frame



This solid steel frame is very stiff, the stock in same being wider than commonly used, and it cannot be cramped by straining the blade. The saws may be set to cut in either of four directions and tightened by simply turning the handle. It is well made and in every way just right.

Polished and nickel plated.

PRICES

8 inch, with one blade.....	\$0.70
9 " " " " ".....	.75
10 " " " " ".....	.80
11 " " " " ".....	.85
12 " " " " ".....	.90

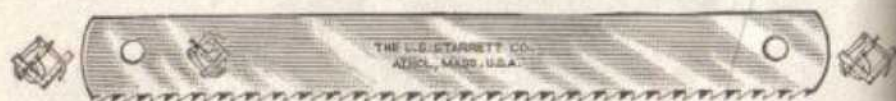
Hack Saw Frame



This is, we believe, a better frame for the price than any other made. The stock is wider and stiffer than commonly used and cannot be cramped when saws are strained up, and will not tremble when used. It is well made with our improved adjustable back and will take in 8, 9, 10, 11 and 12 inch saws, which may be set to cut in either one of four directions, and tightened by simply turning the handle. Polished and nickel plated.

PRICE, with one blade.....\$1.00

Hack Saws



These blades are made of the finest grade of steel. The teeth are sharp, with square cutting points, and evenly set. They are tempered by our improved process, which leaves them hard and tough, so that they will not "shell off." They are too hard to file. The set of the teeth is just enough to insure a free, smooth, and rapid cut, removing no more stock than necessary.

LOOK FOR THIS MARK



ON SAWS AND LABELS.

No. 103

The 6, 7, 8 and 9 inch saws are $\frac{1}{8}$ inch wide, .022 inch thick; the 10, 11 and 12 inch are $\frac{1}{4}$ inch wide, .022 inch thick. All sizes have 14 teeth to the inch.

PRICES

Length.....	6 in.	7 in.	8 in.	9 in.	10 in.	11 in.	12 in.
Per dozen.....	\$0.55	.60	.65	.70	.85	.95	1.05
Per gross.....	6.60	7.20	7.80	8.40	10.20	11.40	12.60

No. 102

With Fine Teeth

For sawing tubing, brass, copper, and sheet metal. 24 teeth to the inch. Width and thickness, same as No. 103. Prices same as for No. 103.

Hack Saws

No. 114

For Q and C and other Large Power Saws

The No. 114 blades are $\frac{3}{8}$ in. wide, .035 in. thick, and have 13 teeth to the inch. These blades are hardened throughout the same as our No. 103, and are adapted specially for heavy work in large power machines like the Q and C and others.

PRICES					
Length.....	12 in.	13 $\frac{1}{2}$ in.	14 in.	16 in.	16 $\frac{1}{2}$ in.
Per dozen	\$ 1.50	1.67	1.67	2.17	2.17
Per gross.....	18.00	20.00	20.00	26.00	26.00

Spring Tempered Back Saws

No. 250

The No. 250 blades, 6, 7, 8, and 9 in., are $\frac{1}{8}$ in. wide, .022 in. thick; 10, 11, and 12 in. are $\frac{1}{4}$ inch wide, .022 in. thick; all sizes have 14 teeth to the inch. These blades are made from the same grade of steel as our other saws. The advantage claimed for these blades over the so-called flexible or soft back saws is that they will not rough up or stretch as the soft back saws are liable to do. The back being left at a spring temper, the saw will not break easily.

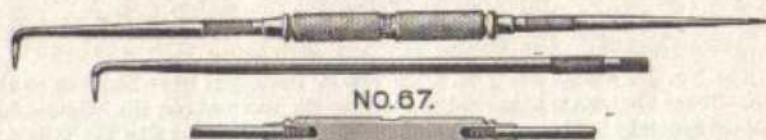
PRICES							
Length.....	6 in.	7 in.	8 in.	9 in.	10 in.	11 in.	12 in.
Per dozen	\$0.55	.80	.65	.70	.85	.95	1.05
Per gross.....	6.60	7.20	7.80	8.40	10.20	11.40	12.60

No. 252

With Fine Teeth

For sawing tubing, brass, copper and sheet metals. 24 teeth to the inch. Width and thickness the same as No. 250. Prices same as for No. 250.

Improved Scriber No. 67



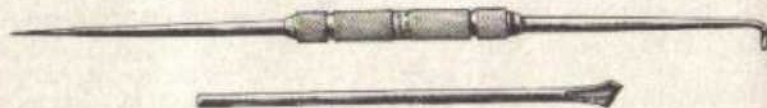
This scriber is made for mechanics who want a better thing than has been heretofore obtainable. These points are made of a fine grade of steel, nicely tempered. The knurled stock is of sufficient size to be easily held without cramping or turning in the fingers. The long, bent point will be found a valuable auxiliary for reaching through holes, etc. Length, with short, bent point, 9 inches; with long point, 12 inches. All parts are interchangeable. The knurled sleeve is nicked.

PRICES

Complete	\$0.45
Without long point.....	.35
Straight point, long or short bent point, each.....	.10

The tool will be sent complete unless otherwise ordered.

Improved Adjustable Sleeve Scriber No. 68



The knurled sleeve has hole clear through and a clamping device at each end, adapting it for slipping on or off different tools, securely holding them near to or away from the working point. The knurled sleeve is nicked.

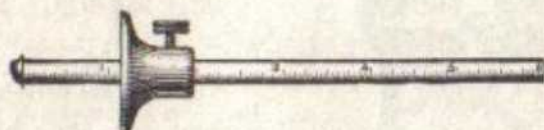
This scriber is made in two lengths, 8 inches and 12 inches. Tool makers will find the small size more desirable for general use, and the larger one for heavier work. For pattern makers a knife scriber, made of a fine grade of steel, is supplied as an auxiliary.

PRICES

Either size, without knife point.....	\$0.50
Knife point, extra.....	.15
Extra scriber points, each.....	.20

The 8 inch, being the more popular size, will be sent (without knife point) unless otherwise ordered.

Scratch Gauge No. 29



This gauge is made of steel with *hardened* cast steel head. Through it is a split bushing, against which the set screw acts to hold it firm. The beam is graduated in either 50ths or 64ths of an inch. The marker is a thin square piece of steel, nicely tempered, which is firmly held against the end of beam, presenting four marking points.

PRICES

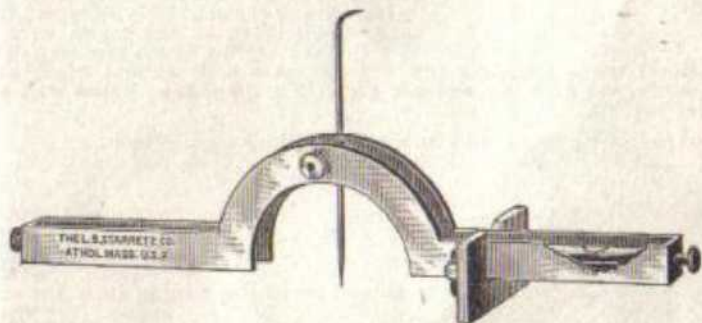
	<i>Graduated</i>	<i>Not Graduated</i>
5 inch (beam $2\frac{1}{8}$ inch).....	\$1.00	\$0.65
6 $\frac{1}{8}$	1.25	.75

Unless otherwise ordered, we shall send those graduated in 64ths.

Two extra cutters will be sent with each gauge, fastened to the case. They should last for years.

No. 29M Graduated in millimeters. PRICE, 10 cm., \$1.00; 15 cm., \$1.25.

Locomotive Guide Liner No. 66

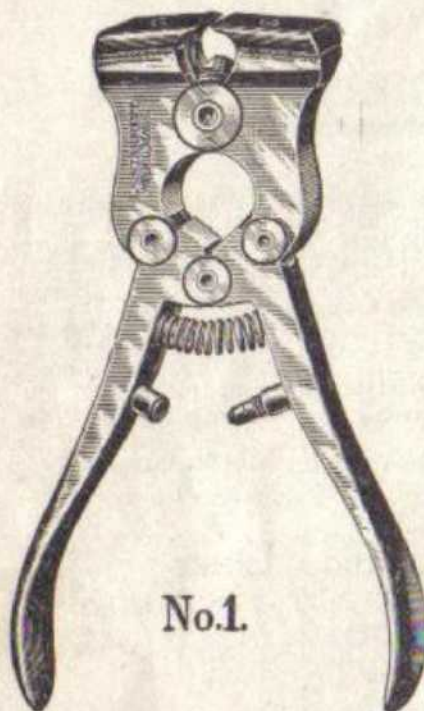


This instrument was devised after many urgent requests from intelligent mechanics, there having been nothing of the kind on the market. The lightness of this tool, combined with strength and accuracy, together with an adjustable level in each end, adapting it to be used either side up, and the convenient way of adjusting the pointer, all go to make it just the thing needed. Length over all, 14 inches; span of arch, $3\frac{1}{4}$ inches.

PRICE.....\$3.00

Adjustable Jaw Cut-Nipper

No. 1



No. 1

The jaws are detachable, so that they can be removed, ground, and adjusted when they have become worn. Each jaw can be ground away to the extent of $\frac{1}{2}$ inch, remaining as good as new for practical use; and when used up, if ever, new jaws can be procured.

A screw through the jaw engages with a spline in the frame and draws the jaw firmly down to the toothed seat, holding it securely.

Another improved feature in this cut-nipper is a flat spring below the cutting edges and over the joint, forming a yielding seat for the end of the wire to press against while being cut. This obviates the danger of breaking the jaws,—as often happens with other styles of cut-nippers which allow the wire to be inserted against a solid surface, thereby creating a pushing out strain on the jaws when they are pressed together.

The head and handles are of drop forged steel, finely finished. All the parts are case-hardened, except the jaws. These are made from a high grade of steel, nicely tempered. Those warranted to cut music wire have their cutting edges ground to a short

steep bevel, while those for *common use* have their cutting edges ground more acute, work easier, and are preferable for cutting softer wire or for general use.

The $5\frac{1}{2}$ inch nippers open $\frac{1}{2}$ inch, and the 7 inch open $\frac{3}{4}$ inch.

For Bicycle Use

We also make jaws specially shaped for cutting wire in bicycle rims.

PRICES

5 $\frac{1}{2}$ inch, M (for music wire).....	\$2.00
5 $\frac{1}{2}$ " " C (for common use).....	2.00
5 $\frac{1}{2}$ " " B (for bicycle use).....	2.00
7 " either M, C, or B.....	2.50
Extra jaws either M, C, or B, which should be designated as above, per pair.....	.50

Unless otherwise ordered, Cut-Nippers with M jaws will be sent.



Surface Gauge

No. 52

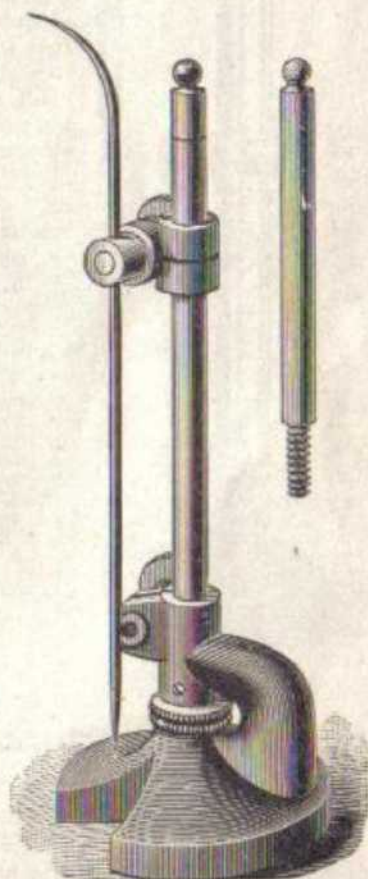
This gauge, with improvements as made for a few years past, gives great satisfaction to all who use it.

The sleeve and needle clasp, when loosened for adjustment, are both held by a slight spring friction, and by a single knurled nut both are rigidly clamped. For fine adjustment, the spindle in the base is raised or lowered by a knurled nut, and all backlash is taken up by a spiral spring in the base.

For above 12 inch lengths, an extension is provided to couple on to the spindle.

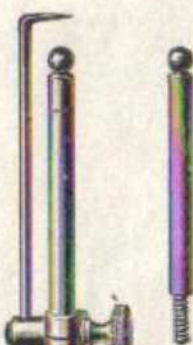
PRICES

No. 52A 8 inch	\$2.00
" 52B 12 "	2.75
" 52C 12 " with 6-inch extension	3.25
Sleeve alone.....	.75



Micrometer Surface Gauge

No. 53



This gauge has a turned and polished base, a micrometer adjusting nut reading 1,000ths, and a six-inch extension for the spindle. By means of springs and taper fitting parts of the sleeve (not shown in cut) the scriber is held by slight friction in any position while adjustments are made, and firmly held by a turn of the nut. A knurled cam on the base releases and locks the spindle for adjusting.

PRICES

No. 53A	8 inch, without extension.....	\$2.50
" 53B	12 " " "	3.50
" 53C	12 " with 6 inch "	4.00

In ordering, give the SIZE wanted.

Surface Gauge Attachment

No. 54



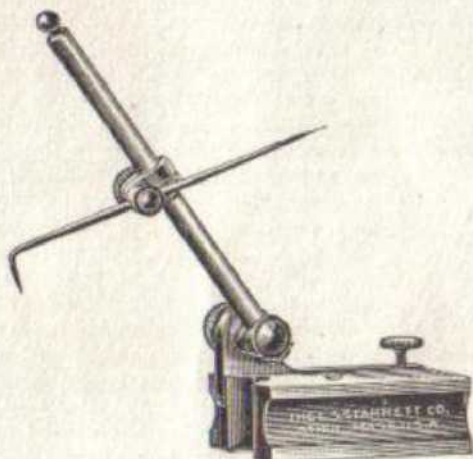
To be used between the centers of the lathe to adjust, locate, and lay out work secured to the face-plate. An auxiliary arbor is supplied size of No. 53 Surface Gauge, 12-inch spindle, the sleeve fitting both spindle and arbor.

Those having the Surface Gauge will need the arbor only.

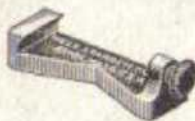
Price of the Auxiliary Arbor.....\$0.50, complete, \$1.50

Tool Makers' Universal Surface Gauge

No. 56



This gauge is admirably adapted for light work. The base is steel, nicely finished and *casehardened*, with depressions milled in the sides for the thumb and finger to grasp. The top side of it is slotted, and the rocking bracket is pivoted in the same. There is a stiff spring under one end of the bracket and a knurled adjusting screw in the other; the spindle jointed to this may be set and rigidly held in any position from vertical to horizontal, and the scriber placed in position to be used below its base for depth gauge, or (with bent end down) a scribing gauge. A V-shaped groove in the end and bottom adapts it for use on cylindrical work. There is a small hole in the clamp next to the base in which the scriber may be used for light work, the spindle being removed. An auxiliary guide piece is furnished to clamp to the base.



It weighs but ten ounces, and is five inches high, and, folding the spindle (which is four inches long) horizontally over the base, it may be packed in $1\frac{1}{2} \times 1\frac{1}{4} \times 4$ inches space in the tool chest.

PRICE, with 4 inch spindle and auxiliary guide..... \$3.00
 " without auxiliary guide..... 2.50

Sent with guide unless otherwise ordered.

A 7 inch spindle is furnished when ordered at an extra cost of 25 cents.

New Universal Surface Gauge No. 57

This gauge has our latest improvements, which make it all that can be desired, possessing the following points of merit:

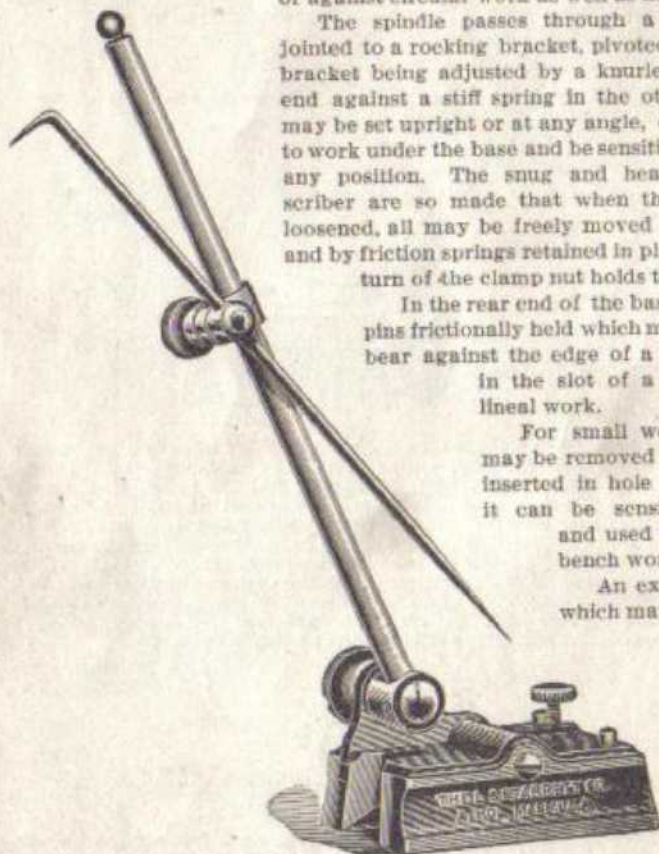
Heavy base, grooved through the bottom and end, adapting it for use on or against circular work as well as flat surfaces.

The spindle passes through a rotating head, jointed to a rocking bracket, pivoted in base. Said bracket being adjusted by a knurled screw in one end against a stiff spring in the other, the spindle may be set upright or at any angle, or turned so as to work under the base and be sensitively adjusted to any position. The snug and head carrying the scriber are so made that when the clamp nut is loosened, all may be freely moved to any position and by friction springs retained in place until a slight turn of the clamp nut holds them firm.

In the rear end of the base are two gauge pins frictionally held which may be pushed to bear against the edge of a surface plate or in the slot of a planer bed for lineal work.

For small work the spindle may be removed and the scriber inserted in hole provided where it can be sensitively adjusted and used to advantage on bench work.

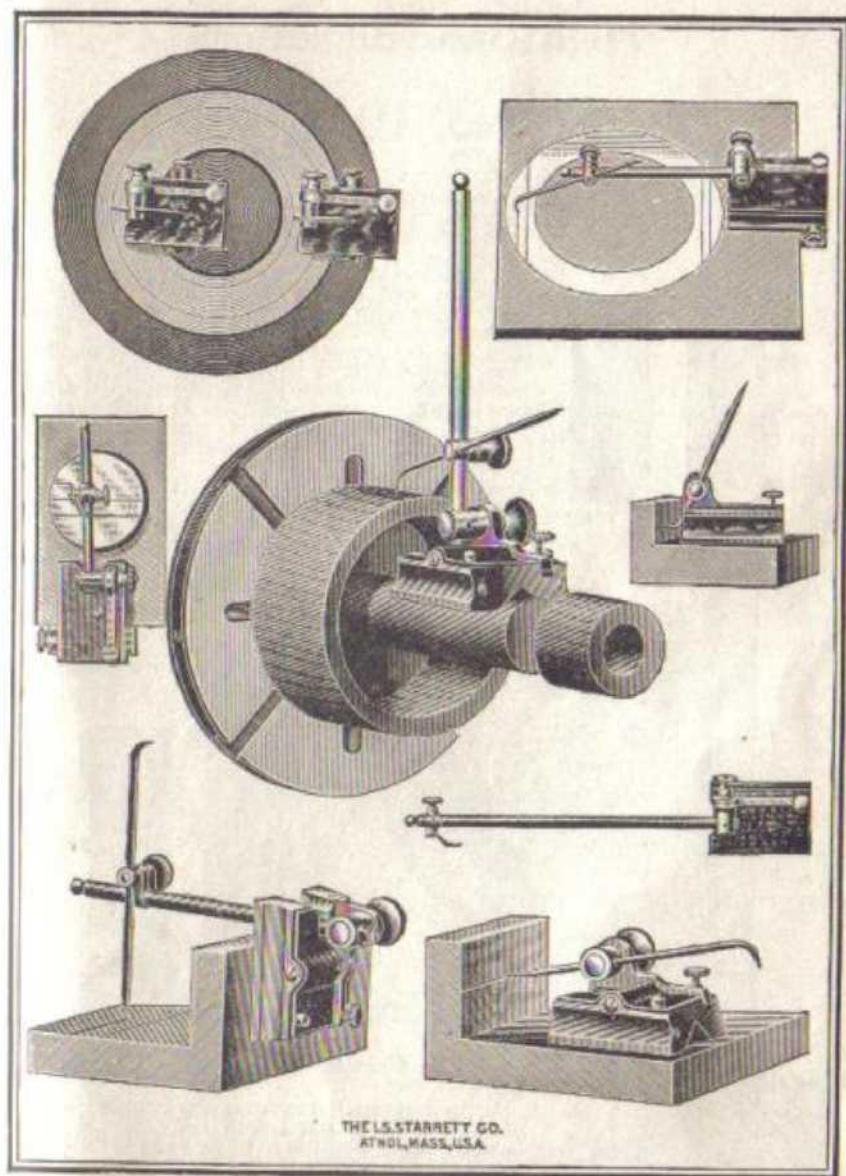
An extra long spindle which may be quickly substituted for the regular will be sent with the gauge when ordered.



PRICES

No. 57A	3 inch base with 9 inch spindle.....	\$2.50
" 57B	3 " " " 9 and 12 inch spindles /.....	2.85
" 57C	3 1/2 " " " 12 inch spindle.....	3.00
" 57D	3 1/2 " " " 12 and 18 inch spindles.....	3.50

Spindles only, at 3 cents per inch, list.



THE L. S. STARRETT CO.
ATHOL, MASS., U.S.A.

Showing a few of the many applications of
No. 56 and No. 57 Surface Gauges

High Speed Indicator

No. 104

This indicator may be run at highest speed required without heating, and this on account of our frictionless bearing against which the inner end of the spindle revolves (a feature patented by us).

The working parts of this instrument are encased, and the dial plate has two rows of figures, reading right or left, as the shaft may run.

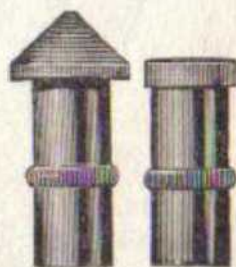
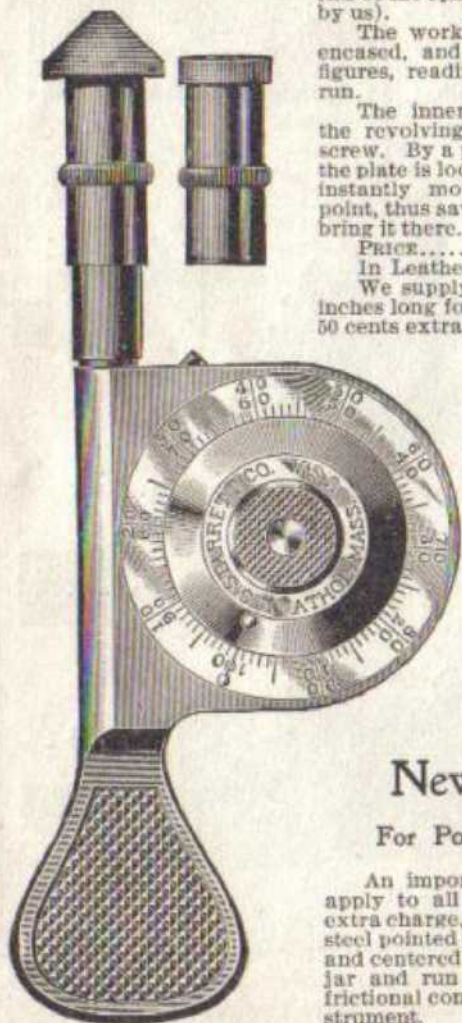
The inner plate is frictionally clamped to the revolving gear by a checked wafer head screw. By a pressure and twist with the thumb the plate is loosened, when the O mark may be instantly moved to agree with the starting point, thus saving time revolving the spindle to bring it there.

PRICE.....\$1.00

In Leatherette case..... 1.50

We supply the indicators with a spindle 7 1/2 inches long for use on Dairy Machines, etc., for 50 cents extra.

The indicator in pasteboard box (list \$1.00) will be sent unless otherwise ordered.



New Rubber Tips

For Pointed and Hollow Centers

An important improvement which we now apply to all of our Speed Indicators, without extra charge, consists in adding to the hardened steel pointed spindle, rubber tips for both pointed and centered shafts, which not only remove the jar and run smoothly, but produce a stronger frictional contact between the shaft and the instrument.

Improved Speed Indicator

No. 106



This is a nicely made and finely working indicator. The working parts are inclosed like a watch, and as well made. The graduations show *every revolution*, and with two rows of figures read both *right and left*, as the shaft may run. While looking on the watch each hundred revolutions may be counted by allowing the oval headed pin on the revolving disc to pass under the thumb as the instrument is pressed to its work. The dial is locked to a revolving stud—a

slight thumb pressure and twist on the knurled eccentric releases it so that the indicator mark may be readily moved and locked to agree with the starting point, thus saving the necessity of turning the instrument to bring it there.

The instrument is nickel plated, and has a rosewood handle, so that it will not heat the fingers when run at high speed. Has our new rubber tips for both pointed and hollow centers.

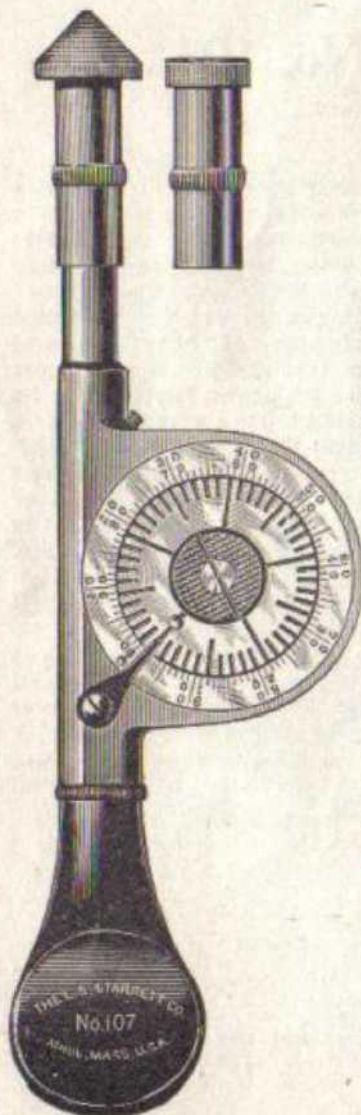
PRICES

In Pasteboard box.....	\$1.50
In Leatherette case.....	2.00

Sent in pasteboard box unless otherwise ordered.

Registering Speed Indicator

No. 107



This instrument was devised to automatically register hundreds as well as units and tens, and thus relieve the mind from keeping tally; also to furnish a better registering indicator at a more reasonable cost than heretofore. The instrument will register 5,000 revolutions. The large dial is graduated into one hundred lines, each one representing a revolution of the spindle. The small dial has fifty lines cut upon its face, each representing one hundred revolutions of the spindle (or one complete turn of the large dial). A spring finger trip attached to the case engages with one of the lines in the small dial and holds it from revolving until the large dial makes one complete turn, when the trip pin passing under the spring trip lifts it, and the dial is frictionally carried along by the large plate one line, thus showing that one hundred revolutions of the spindle have been made. The instrument has a hard rubber handle, making a safe insulator when used on electrical machinery. It has our new rubber tips for both pointed and hollow centers.

PRICES

In Pasteboard box.....	\$3.00
In Leatherette case.....	3.50

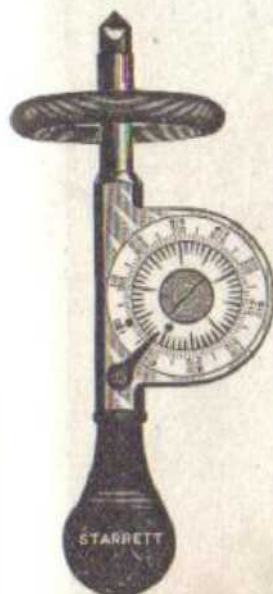
Sent in pasteboard box unless otherwise ordered.

Surface Speed Attachment for Speed Indicators

No.

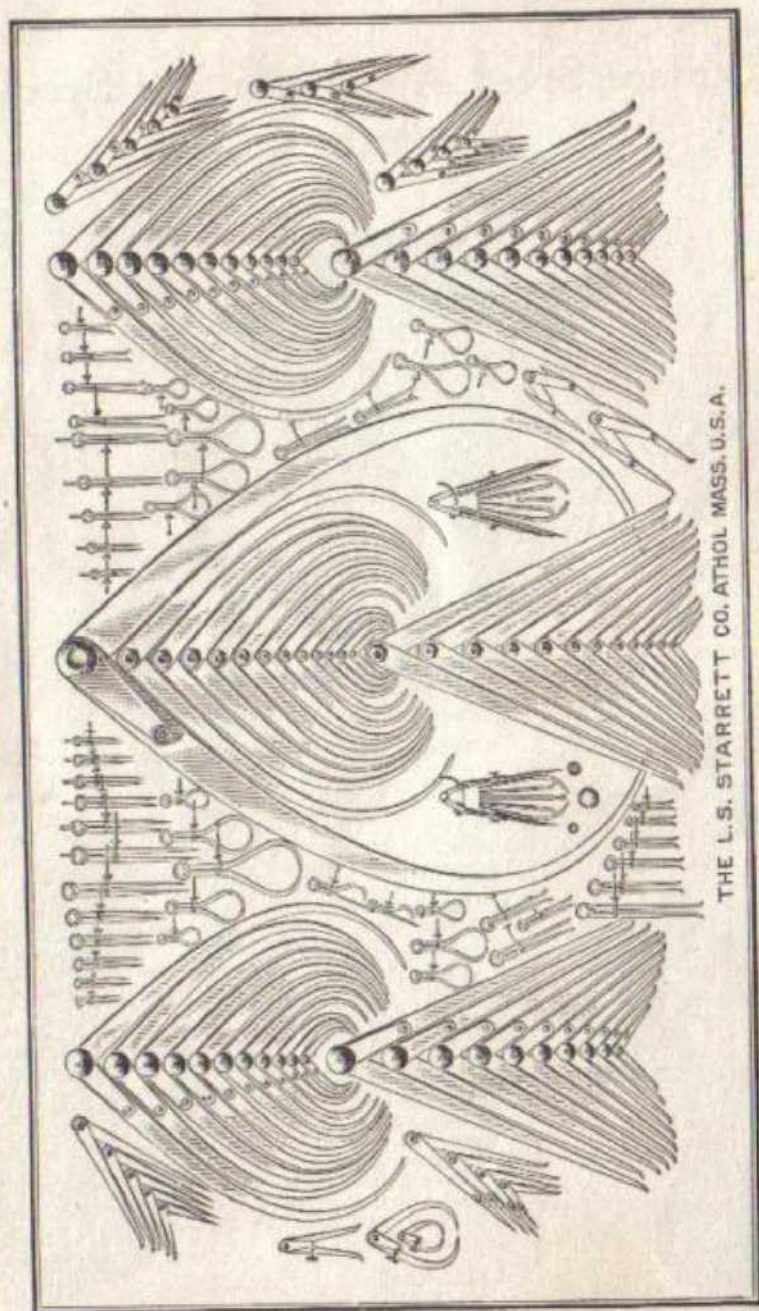


109



This attachment applied to one of our speed indicators is designed to show the number of lineal feet per minute the periphery of a shaft or pulley is running and thus enable a workman to know if the speed is too fast, or is too slow to get the most work the tool will stand. For instance, the speed of a cone pulley being turned needs to be changed at every step. Heretofore it has been all guesswork as to the number of feet per minute the periphery of the work is traveling. It may be so fast as to heat and spoil the tool, or it may not be nearly fast enough to perform what should be done. The same is true when shifting the tool from the hub to the rim of a pulley. The rubber-banded indicator wheel may be instantly slipped off or on the spindle of any of our speed indicators, and when held against the periphery of a shaft or pulley a half minute or a minute, by dividing the figures showing the revolutions on the dial of the indicator by 2, the number of feet the surface of the thing is traveling is obtained, as each revolution of the indicator wheel shows six inches; twice around, one foot. A close approach to accuracy is not claimed for this attachment, but it will be found very convenient and adequate for the purposes intended, as suggested above.

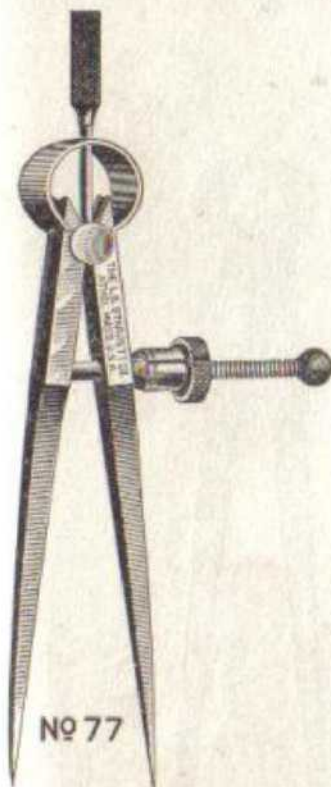
PRICE, each,.....\$0.50



THE L. S. STARRETT CO. ATHOL MASS. U.S.A.

The Fay Patent Spring Dividers

With Spring Nut



Spring Nut

The Fay Calipers and Dividers, Nos. 74 to 77 all sizes, are sent *with Spring Nut* unless otherwise ordered.

No 77

The above cut represents our Spring Dividers with new quick-adjusting, automatic closing spring nut, a critical examination of which will at once show their superiority over all others on the market. Their use will save much valuable time in opening and closing spring-bow calipers and dividers.

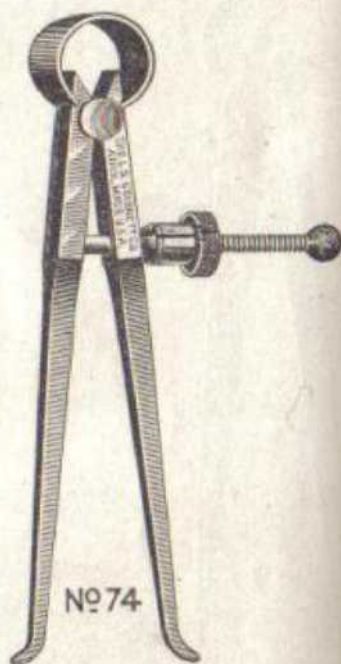
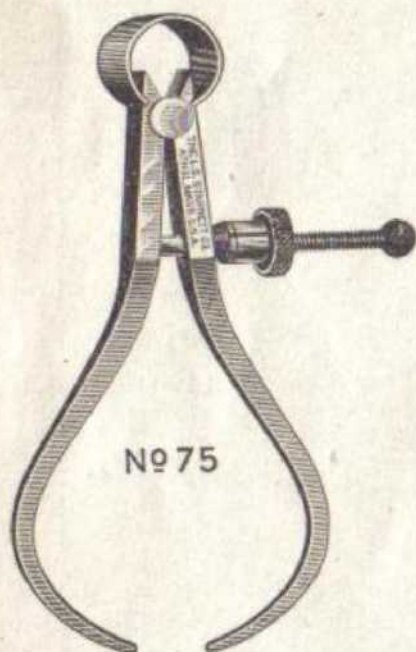
They are also made with a solid nut.

PRICES

	with spring nut...	with solid nut.....	
2½ inch, each,	\$1.15	\$1.00	
3 " " " " "	1.15	1.00	
4 " " " " "	1.40	1.25	
5 " " " " "	1.40	1.25	
6 " " " " "	1.75	1.60	
8 " " " " "	2.00	1.85	

The Fay Patent Outside and Inside Calipers

With Spring Nut



PRICES

OUTSIDE, No. 75

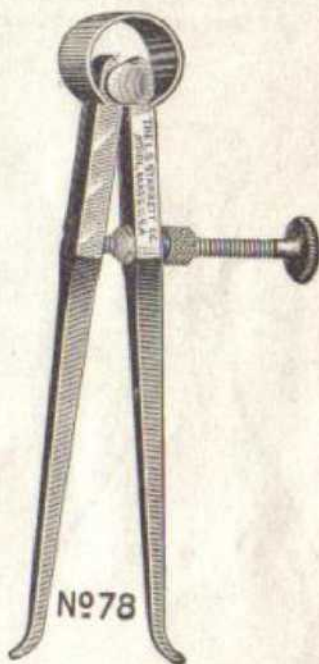
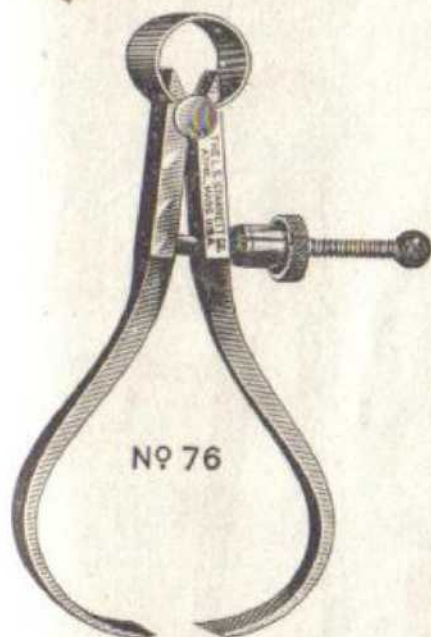
	Solid Nut	Spring Nut
2½ inch.....	\$1.00	\$1.15
3 ".....	1.00	1.15
4 ".....	1.10	1.25
5 ".....	1.10	1.25
6 ".....	1.35	1.50
8 ".....	1.60	1.75

INSIDE, No. 74

	Solid Nut	Spring Nut
2½ inch.....	\$1.00	\$1.15
3 ".....	1.00	1.15
4 ".....	1.10	1.25
5 ".....	1.10	1.25
6 ".....	1.35	1.50
8 ".....	1.60	1.75

These calipers will be sent with *Spring Nut* unless otherwise ordered.

The Fay Patent Thread and Inside Calipers



THREAD, No. 76

PRICES

INSIDE, No. 78

Solid Nut Spring Nut

3 inch	\$1.00	\$1.15
4 "	1.10	1.25
6 "	1.10	1.25

4 inch	<i>Solid Nut</i> \$1.10
5 "	1.10

No. 78 Inside Calipers are not made to receive the spring nut.
No. 76 sent with spring nut unless otherwise ordered.

Duplicate Parts of Fay Calipers or Dividers

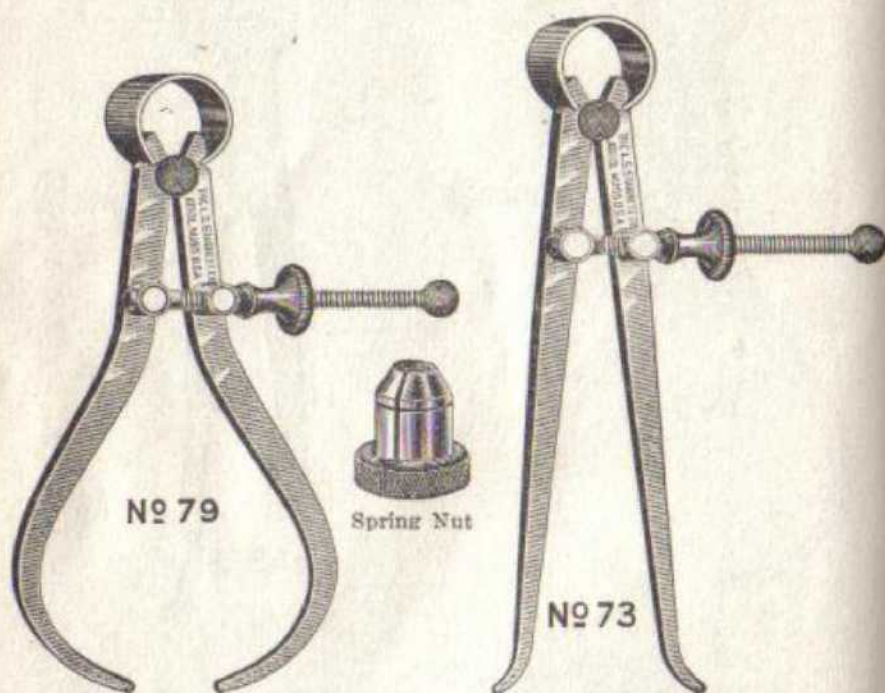
PRICES

Screw and Ball	\$0.15	Leg	\$0.35
Thumb Attachment .....	.15	Spring .....	.25
Solid Nut .....	.10	Jam Washer .....	.10
Spring Nut .....	.25	Fulcrum Stud .....	.10

Yankee Outside and Inside Calipers

The Yankee Calipers and Dividers are manufactured under the Fay patent, are not quite so heavy as the Fay, and cost less. They are much liked, and on account of price are preferred by many to the higher cost tools.

All sizes are supplied with either solid or quick adjusting nut.



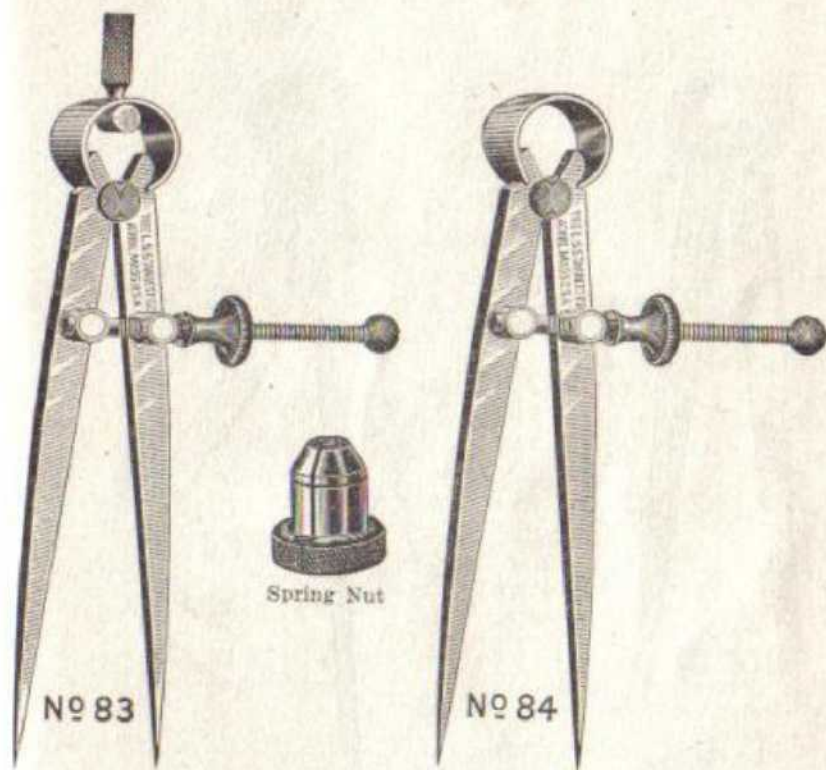
No. 73 represents a new Yankee Inside Transfer Caliper with either spring or solid nut. The bow is stiff, making the caliper reliable. After calipering inside of chambered cavity by springing in the legs they may be withdrawn, and as they spring back will show the exact size calipered.

PRICES, No. 79 OR No. 73

2 1/4 inch, with solid nut.....	\$0.65	with spring nut.....	\$0.80
3 " " " " .....	.70	" " " " .....	.85
4 " " " " .....	.75	" " " " .....	.90
5 " " " " .....	.80	" " " " .....	.95
6 " " " " .....	.85	" " " "	1.00
8 " " " "	1.00	" " " "	1.15

Sent with solid nut, unless otherwise ordered.

Yankee Spring Dividers

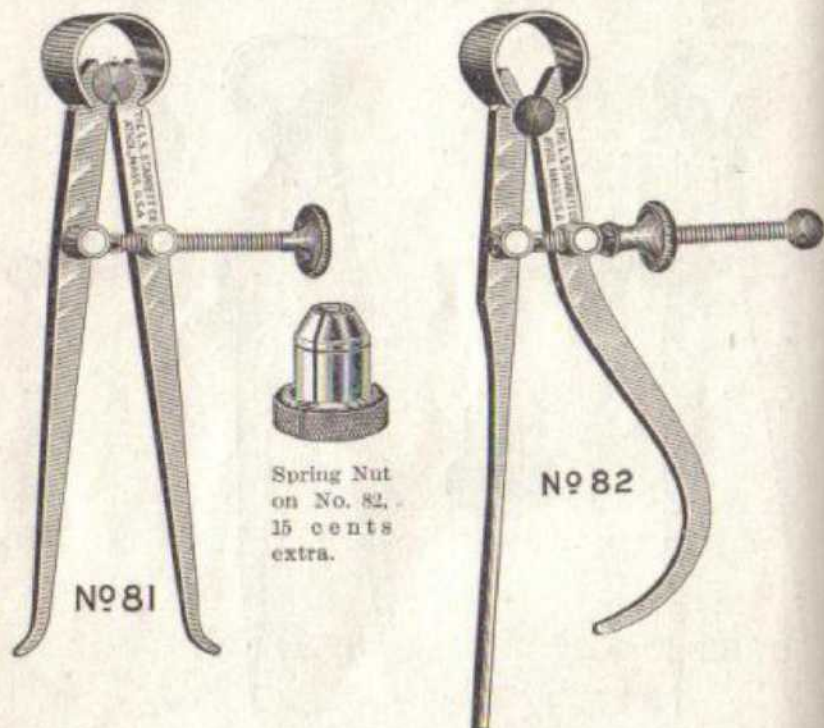


PRICES (Either Style, No. 83 or No. 84)

2½ inch, each.....	\$0.65	with spring nut.....	\$0.80
3 " " ".....	.70	" " ".....	.85
4 " " ".....	.75	" " ".....	.90
5 " " ".....	.80	" " ".....	.95
6 " " ".....	.85	" " ".....	1.00
8 " " ".....	1.10	" " ".....	1.25

Sent with solid nut unless otherwise ordered.

Yankee Inside and Keyhole Calipers



PRICES

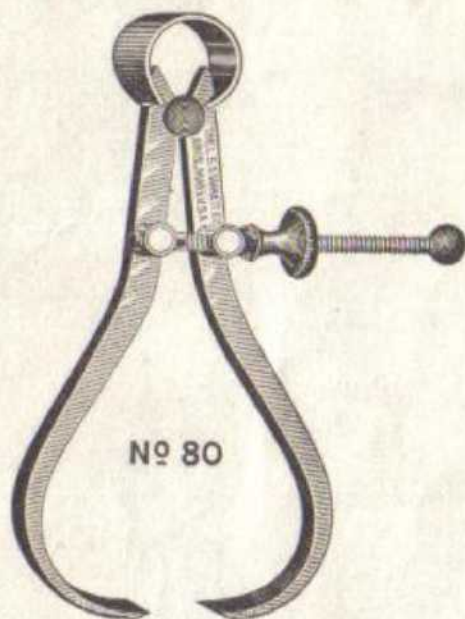
INSIDE, No. 81

4 inch, with solid nut, each.....	\$0.75
5 " " " " " .....	.80
6 " " " " " .....	.85

KEYHOLE, No. 82

3 inch, with solid nut, each.....	\$0.70
4 " " " " " .....	.75

Yankee Thread Calipers



Spring Nut

PRICES

3 inch, with solid nut.....	\$0.70	with spring nut.....	\$0.85
4 " " " " .....	.75	" " " " .....	.90
5 " " " " .....	.80	" " " " .....	.95

Sent with solid nut unless otherwise ordered.

Duplicate Parts of Yankee Calipers or Dividers

PRICES

Screw and Ball.....	\$0.15	Spring	\$0.25
Thumb Attachment.....	.15	Jam Washer.....	.10
Solid Nut.....	.10	Fulcrum Stud.....	.10
Spring Nut.....	.25	Stud .....	.10
Leg .....	.25		

Inside Thread Calipers

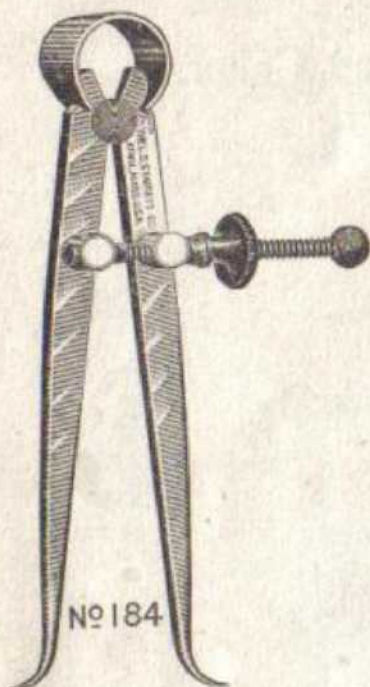
No. 184

These calipers are designed for measuring the diameter at bottom of threads.

PRICES

	<i>Solid Nut</i>	<i>Spring Nut</i>
4 inch.....	\$0.75	\$0.90
5 " .....	.80	.95
6 " .....	.85	1.00

Sent with solid nut unless otherwise ordered.



Outside Thread Calipers

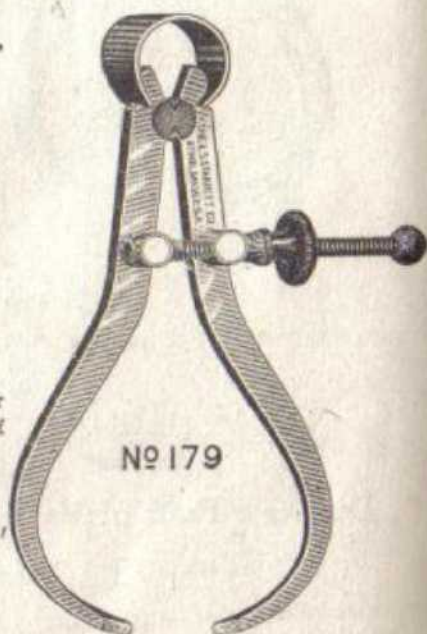
No. 179

These calipers are designed for measuring the diameter at bottom of threads on the outside of screws.

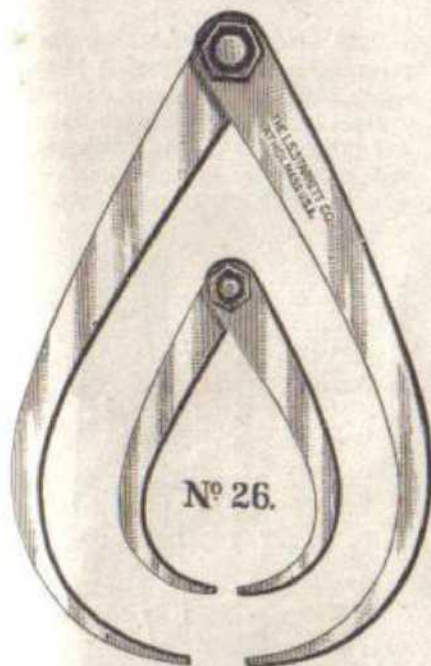
PRICES

	<i>Solid Nut</i>	<i>Spring Nut</i>
4 inch.....	\$0.75	\$0.90
5 " .....	.80	.95
6 " .....	.85	1.00

Sent with solid nut unless otherwise ordered.



Improved Firm-Joint Calipers



PRICES

3 inch	.....	\$0.40
4 "	.....	.50
5 "	.....	.55
6 "	.....	.65
8 "	.....	.80
10 "	.....	.90
12 "	.....	1.00
14 "	.....	1.50
16 "	.....	1.75
18 "	.....	2.10
20 "	.....	2.50
24 "	.....	3.00
30 "	.....	5.00
36 "	.....	6.00

The above sizes refer to the *length* of the calipers.

Their capacity is about one third greater than the size given; for example, the 30 inch size will caliper 38 inch, and the 36 inch size will caliper 46 inch diameter.

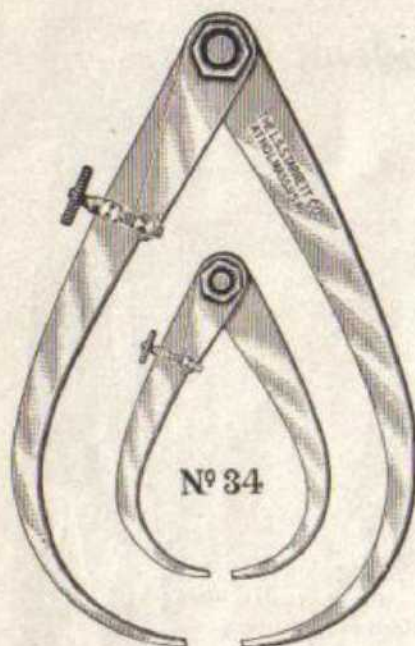


The improvement in these calipers consists in the construction of the joint, which is so made as to be drawn together by means of a screw. The main stud is squared and fitted to one leg, thus preventing the stud from turning when loosening and tightening, and insuring a SMOOTH and UNIFORM friction, of more or less tension to suit the user.

The quality of these calipers is incomparably superior to that of any old style riveted-joint caliper on the market.

Perfected Firm-Joint Screw- Adjusting Calipers

The screw adjustment for fine measurements, the improved joint which may be set to any desired degree of uniform tension, the shape and stiffness of the legs, quickness and wide scope of adjustment,—all go to make this caliper a leader in its line.



No 34

PRICES, NOS. 34
AND 35

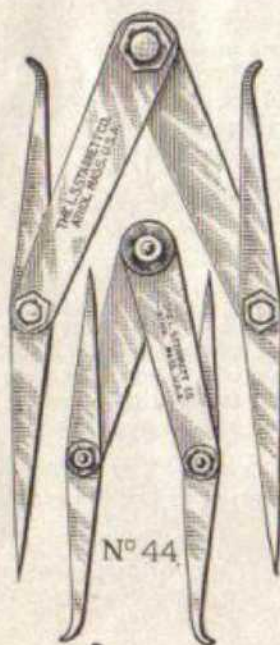
4 inch.....	\$0.90
6 ".....	1.00
8 ".....	1.25
10 ".....	1.50
12 ".....	1.75
14 ".....	2.00
16 ".....	2.25
18 ".....	2.50
20 ".....	2.75
24 ".....	3.50
30 ".....	6.00
36 ".....	7.00



No 35.

Double Calipers

These instruments, as will be seen from the engraving, combine dividers, inside and outside calipers. They have our improved firm friction joints.



No 44

PRICES, No. 44

6 inch.....	\$1.25
8 ".....	1.50

Firm-Joint Hermaphrodite Calipers

No. 41

These calipers have our adjustable point, as well as the improved firm joint, which has made our No. 26 Outside and No. 27 Inside Calipers deservedly popular among mechanics. This joint, with its smooth and uniform friction, is incomparably superior to the old style riveted joint.

PRICES

4 inch.....	\$0.65
6 ".....	.80
8 ".....	1.00
10 ".....	1.20



No. 41

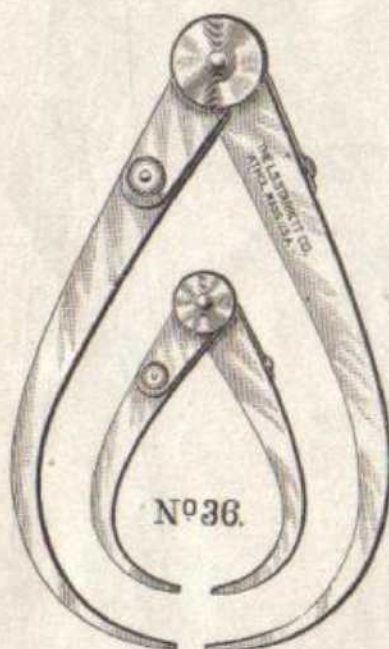
No. 241

The same as No. 41 except the left hand point (see cut) is solid instead of adjustable.

PRICES

3 inch.....	\$0.40
4 ".....	.50
5 ".....	.55
6 ".....	.65
8 ".....	.80
10 ".....	.90
12 ".....	1.00

Lock-Joint Transfer Calipers



PRICES

4 inch	\$1.25
5 "	1.40
6 "	1.50
8 "	1.75
10 "	2.00
12 "	2.25
14 "	2.50
16 "	2.75
18 "	3.00
20 "	3.50
24 "	4.25



These instruments (Nos. 36 and 37) not only have all the excellent features of Nos. 38 and 39, as described on another page, but in addition to common use may be used inside of chambered cavities, over flanges, etc., removed and replaced without losing the size calipered. This is done by loosening the nut binding one arm to the auxiliary leaf and swinging it out or in (while the joint is locked) to clear the obstruction, then moving it back against a stop, where it will show the exact size measured.

The sizes given refer to the length of the calipers, but the outside ones will caliper a cylinder 20 per cent. larger than their length, and the inside calipers will open nearly twice their length. This applies also to Nos. 26 and 27, page 129, Nos. 34 and 35, page 130, and to Nos. 38 and 39, page 133.

Lock-Joint Calipers



Nº38

PRICES

4 inch.....	\$0.90
5 " .....	.95
6 "	1.00
8 "	1.25
10 "	1.50
12 "	1.75
14 "	2.00
16 "	2.25
18 "	2.50
20 "	2.75
24 "	3.50



Nº39

These cuts represent long needed tools, viz.: simple, light, low-priced and reliable calipers of wide scope for both inside and outside work, that can be instantly adjusted to their full extent, and as quickly locked firm in the joint, and yet provided with a sensitive adjustment. The improvement consists, first, in a socket joint made tapering, and locked or released by a partial turn of the knurled disc drawing it together. A spring washer under the disc maintains an easy friction in the joint when unlocked.

To further describe, in the under side of short arm is a slot containing a stiff spring. Riveted into the middle leg and projecting through an opening in the arm, is a *threaded stud* on which is a knurled nut having a beveled hub, —this bears against a cone in the arm,—the action of the spring holding them together turns the nut, presses them apart and adjusts the leg when the joint is locked. The spring taking up all backlash the legs are firm.

Hermaphrodite Calipers

No. 42

With our adjustable point, lock-joint and sensitive adjustment.

PRICES

4 inch	\$1.00
6 "	1.15
8 "	1.35
10 "	1.60



No. 42

No. 242

The same as No. 42 except the left hand point (see cut) is solid instead of adjustable.

PRICES

4 inch	\$0.90
6 "	1.00
8 "	1.25
10 "	1.50

New Dividers

No. 43

With our improved lock-joint attachment and sensitive adjustment. It is light and stiff, with large capacity, instantly opened, closed, and locked. The points are nicely tempered.

PRICES

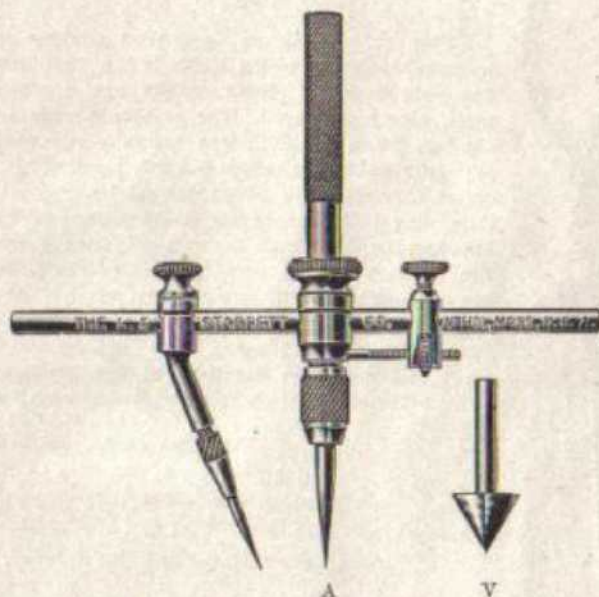
6 inch	\$1.00
8 "	1.25
10 "	1.50



No. 43

Universal Dividers

No. 89



The adjustable scriber holder is reversible and carries either a fine tempered steel point or a pencil lead, held in a split socket by a knurled nut. With the holder turned outward it is possible to work close to shoulders, something that cannot be done by a similar tool of any other make; turned inward, points may be brought close together to scribe the smallest circle. With 4 in. beam, $7\frac{1}{2}$ in. and under may be scribed. An auxiliary beam 13 in. long is furnished, with which a 25 in. circle may be drawn. The V center point may be substituted for the regular point, adapting the tool for scribing around a drilled hole. We also furnish a pen attachment.

PRICES

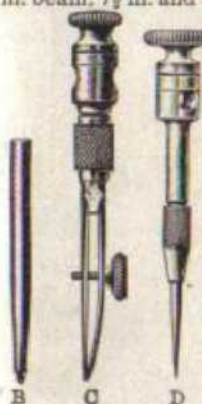
Tool with 4 in. beam and V center point..... \$1.75

LIST OF EXTRAS

A.	Extra Steel Points, each.....	\$0.10
B.	Needle Points, each.....	0.15
C.	Pen Attachment.....	1.00
D.	Extra Straight Point and Socket.....	.50
E.	Extra 13 in. Beam to scribe 25 in. circle.....	.25

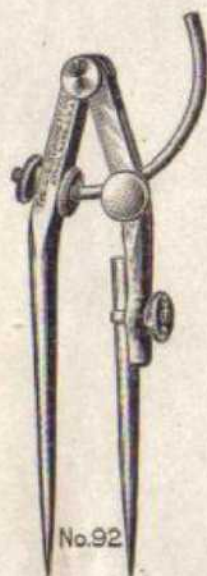
Total for tool and all attachments..... \$3.75

Tool and V Center Point, listing at \$1.75, sent unless otherwise ordered.



Patent Dividers

No. 92



This cut shows an improved divider with our patented features, which make it the best thing in its line yet produced. Both points are crucible forged steel, nicely tempered. The quadrant passes through the leg, which is split. The clamp screw springs the slit parts and frictionally locks the quadrant firm. The screw threads have stock enough to last a lifetime. After fine adjustments are made, our patent lock nut between the arms locks the spring in the leg firm, curing the defect in the old style dividers of the points dodging out and in with the grain of the wood. The adjustable point may be instantly removed and a common pencil inserted in its place. The dividers are light yet rigid and pretty to handle, and are worth twice the price of the cheap malleable dividers now on the market.

PRICES

	6 in.	7 in.	8 in.	9 in.
Plain,	\$0.85	.90	1.00	1.15
Nickeled,	1.10	1.15	1.25	1.40

Sent plain, unless otherwise ordered.

Ball Points

No. 88

For Use with No. 85 or No. 90 Dividers and No. 51, No. 58, and No. 59 Trammels

This attachment consists of four balls, of $1\frac{1}{2}$ inch, 1 inch, $\frac{3}{4}$ inch, and $\frac{1}{2}$ inch diameter respectively, and a holder which fits either divider leg or trammel head. It is used to form a seat for the divider leg in describing circles around a hole.

PRICES

Complete, 4 Balls and Holder.....	\$1.25
Either Ball or Holder.....	.25



Improved Extension Divider

No. 85

This is a well-made, nicely finished divider, with auxiliary caliper legs, which, together with a common pencil, form convenient combinations. Our patent locking nut between the arms, against which a spiral spring acts, is a valuable feature. After the fine adjustment is made, the nut may be turned back, locking spring and arms firmly, thus remedying the weak point which renders the common wing divider only as stiff as the adjusting spring. A full-threaded nut on the stud, through which the quadrant passes, is a more durable fastener than two or three threads tapped in the arm to hold the wing of the old style. The head and arms of this tool are made from best malleable iron, the rest of steel. The points are hardened and warranted first-class. The smallest size is 7 inches long; by adjustment of points it becomes 9 inches, and will scribe a 22-inch circle; will caliper 11 inches outside and 13 inches inside. The second size is 9 inches; by adjustment of points it becomes 12 inches, and will scribe a 30-inch circle, and caliper 14 inches outside and 16 inches inside.



PRICES

[illegible]

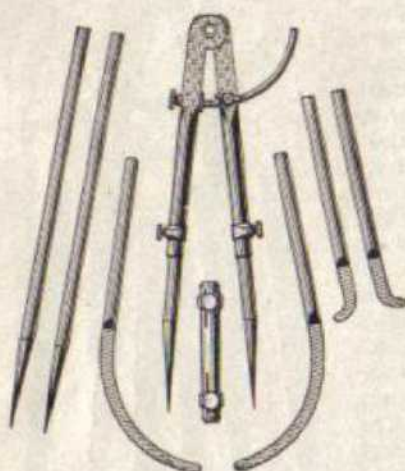
Sent complete unless otherwise ordered.

For Ball Points which may be used with this tool, see page 136.

Improved Bronze Divider

No. 90

Nickel Plated



The head and socket legs of this tool are made from drawn (not cast) bronze metal, and are hard, tough, strong, finely finished and nickel plated.

The joint is large and firm. Our patent locking nut between the arms, against which a spiral spring acts, is a valuable feature. After the fine adjustment is made, the nut may be turned back, locking spring and arms firmly, thus remedying the weak point in the common wing divider, which is only as stiff as the adjusting spring. The quadrant is fastened by our improved method.

A common pencil fits either socketed leg, while an auxiliary holder fits reversed end of either short point for an extension. The head, with short point, is eight inches long; may be extended two inches more; will caliper 10 inches outside and $12\frac{1}{4}$ inside. With short points it will scribe a 24-inch and with long points a 34-inch circle.

PRICES

With short points only.....	\$2.25
Set complete	4.00
Sent complete, unless otherwise ordered.	

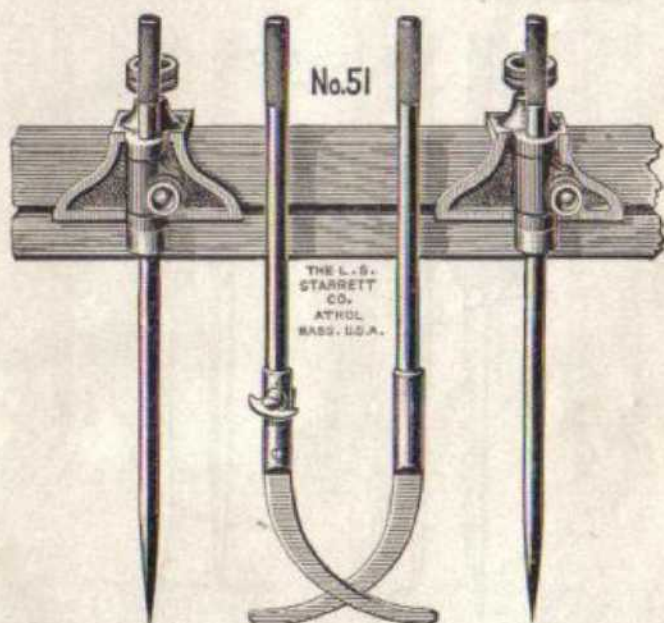
Extra Parts

Long Points	\$0.50
Outside or Inside Caliper Legs .....	.50
Auxiliary Pencil Holder.....	.40
Extra Long Points (will scribe 44-inch circle) made to order .....	.60

For Ball Points which may be used with this tool, see page 136.

Extension Beam Trammels

No. 51



Nickel Plated

The above cut represents a pair of Trammel Heads, with an opening through the under side to accommodate the extension, giving width and stiffness in proportion to the length required for large work, while it is equally well adapted to receive a narrow beam for light work.

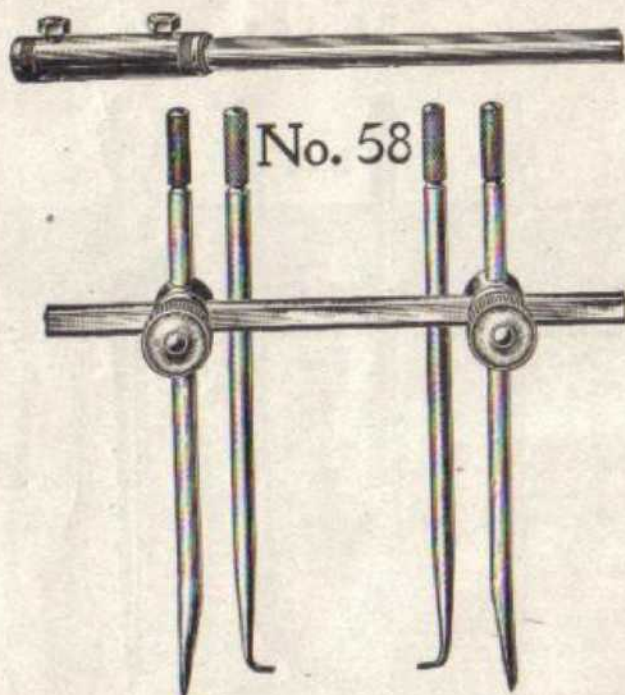
The points are eccentric, and may be loosened and rotated in their sockets to make fine adjustments. Either point may be removed and a common pencil inserted.

One of the caliper legs is provided with a joint, worked by an eccentric thumb piece for fine adjustments.

PRICES

Complete.....	\$3.25
Without Caliper Legs.....	2.50
Sent complete, unless otherwise ordered.	
For Ball Points which may be used with this tool, see page 136.	

Extension Steel Beam Trammels



The beam of this tool is $\frac{1}{8}$ inch round, with one side flattened. It is made in one, two or three sections, of 14 inch lengths each, and coupled together by means of our improved socket coupling and grip nut, rigidly holding them for long reaches. With one 14 inch section only, it weighs but 8 ounces. The slides carrying the points grip both beam and points by a partial turn of the knurled nut. Fine adjustments are made by a slight rotation of one or the other eccentric point, which by friction springs retain it when the nut is loosened.

The trams are nicely finished and will be supplied with any number of the sections desired.

PRICES

	Not Plated	Plated
A. with one Section, 14 inch.....	\$2.20	\$2.50
B. " two " 28 "	2.60	3.00
C. " three " 42 "	3.00	3.50
Extra Sections.....	.40	.50
Caliper Points to fit this tool, extra, per pair.....	.50	.60

Those not nickeled will be sent unless otherwise ordered.

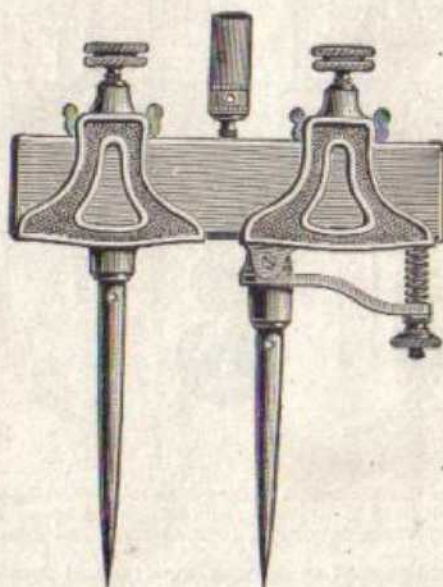
For ball points which may be used with this tool, see page 136.

When ball points are to be used with No. 58 the fact should be mentioned in the order.

Improved Trammel Points

No. 50

Nickel Plated



Made of bronze metal, with forged steel points, hardened.

Either point can be removed, and the pencil socket accompanying each pair put in its place.

Adjustable like spring dividers. Light and durable.

PRICES

With 3 inch points, adjustable.....	\$2.50
" " " " not adjustable.....	1.50
Extra long points, 5 inch. per set.....	.35

Machinists' Center Punches No. 117

Made to supply the demand for a better article than has heretofore been on the market. Made of fine steel, neatly shaped, with both ends tempered and points nicely ground.

Length of each size 4 inches. Diameter, A $\frac{1}{8}$ inch, B $\frac{3}{16}$ inch, C $\frac{1}{4}$ inch, D $\frac{5}{16}$ inch.

A larger size, E, is made for heavy work, —diameter $\frac{1}{2}$ inch, diameter of knurled part $\frac{3}{4}$ inch.

PRICE

Per dozen.....	\$2.00
Each.....	.30
Per dozen in wooden box	2.15

Sent in wooden box only when so ordered.



Spacing Center Punch No. 118

Starrett's Combination Prick Punch and Spacing Tool is just the thing for laying off work quickly and accurately—for drilling, cutting out dies, etc. The prick punch is solid—made from best tool steel, properly tempered. The guide point is set in a socket with a spiral spring to press it down. When the punch is struck, the guide presses back into its socket, permitting the punch to be held straight over its work, and insuring accurate results. The screw with check nut sets the spacer right for small or large drill.

PRICE	\$0.75
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Nail Sets

No. 116

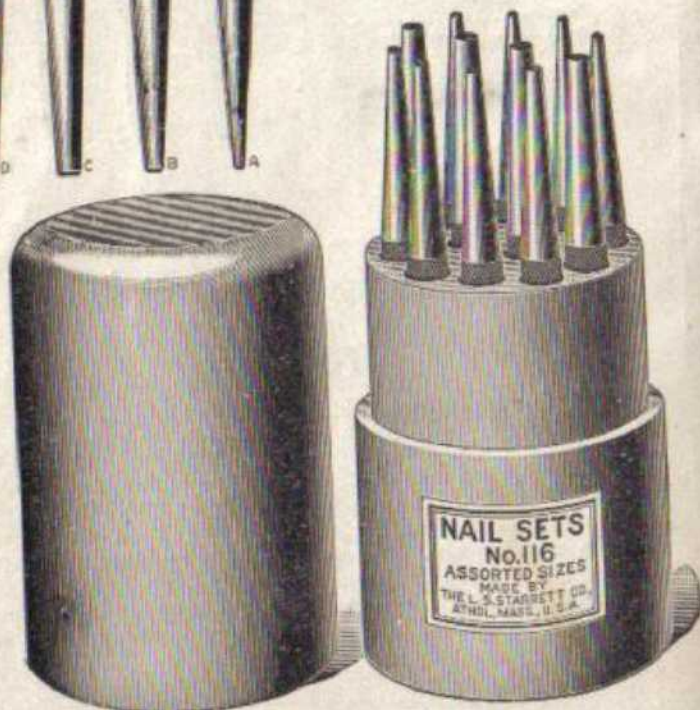
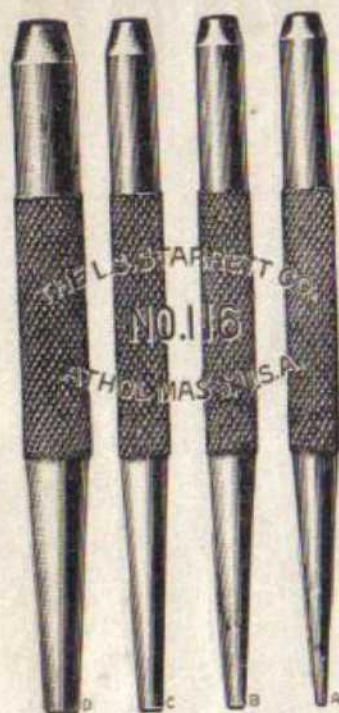
Made of a fine grade of steel, both ends hardened, centers nicely knurled, tips concaved, tops oval, and the size just right.

Length of each size 4 inches. Diameter at tip, A $\frac{1}{8}$ inch, B $\frac{3}{16}$ inch, C $\frac{1}{4}$ inch, D $\frac{5}{16}$ inch.

PRICE

Per dozen.....	\$1.00
Each.....	.10
Per dozen, in wooden box, as shown	1.15

Sent without the wooden box unless otherwise ordered.



Patent Nail Holder and Set

No. 119

This cut shows our finished Nail Holder and Set combined. The nail may be instantly placed under the spring in the lower end of the holder and there retained by the pressure of same, ready to be driven home. After one blow is struck, the holder is withdrawn and the nail driven in and sunk with the punch—a great improvement over the difficult way of trying to hold a small nail between the thumb and finger at the risk of pounding them. The holder also admits of the nail being held to drive in places where the hand cannot go.

PRICE, each.....35 cents.



Pocket Screw Driver.

No. 150

With Brad Awl and Wrench

A compact combination of three tools a man is apt to wish he had with him a dozen times a day. Consists of a neat, finely finished steel handle with a knurled nut which firmly holds a screw driver and brad awl made in one piece, this being telescoped within the handle when not in use. The shape of the handle enables it to be used as an emergency wrench—often of the greatest convenience.

The tool weighs only two ounces.

It is of especial value to wheelmen, as it takes the place of a number of tools usually carried with a bicycle.

PRICES

Plain, each.....	\$0.25
Nickel, each.....	.30

Sent plain unless otherwise ordered.



No. 151

This is the same as No. 150 above, except that there is a screw driver at both ends of the blade, one larger than the other.

PRICES same as for No. 150.

Starrett Patent Screw Driver No. 550



This screw driver has a knurled hardwood handle, $1\frac{1}{2}$ inch diameter, large enough to fill the hand and give leverage. Its steel shank has a socketed end to which is fitted a set of three screw driver tips of different sizes, adapted for screw heads from very small up to $\frac{1}{4}$ inch. Either size may be instantly withdrawn and another inserted, thus supplying a full set of screw drivers at a fraction of the cost of others requiring as many handles as drivers. The tips are shaped and tempered to give greatest strength. The screw driver is 10 inches long.

PRICES

Screw Driver, with 3 tips.....	\$0.75
Duplicate Tips, per set, .25c; each.....	.10

Starrett Patent Combination Screw Driver No. 551



This tool is the same as No. 550, with the addition of a sleeve with spring fingers which slides on the shank, and a set of brad awls which may be used interchangeably with the screw driver tips. The ends of the fingers grasp the head of the screw, draw it back and hold it in firm contact with the screw driver, so that the screw can be driven home straight and true without the annoyance of its slipping from the head, and in places where it would be difficult, if not impossible, to start screws with a common driver. The fingers not only hold screws but the brad awls as well from pulling out, thus forming the best screw and brad holder and driver ever known. The changing of one tool for another may be done almost instantly, there being no screws to bind or anything to get out of order. Slipping the finger sleeve up against a stop and sliding the knurled ring closes them on the screw head and holds it as in a vise. The brad awls and screw driver tips are put up in a neat case, and can be carried in the pocket. Every householder as well as every mechanic should have a set.

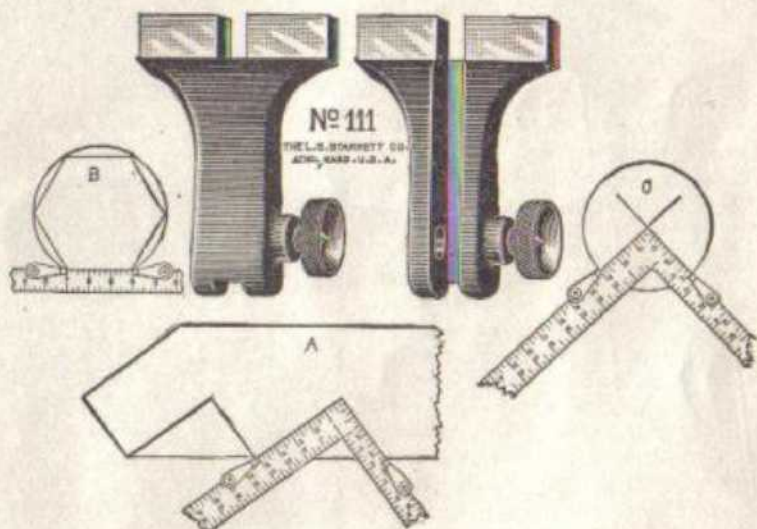
PRICES

A. Screw Driver, complete, with spring fingers, 3 screw driver tips and 3 brad-awls.....	\$1.50
B. Screw Driver with spring fingers and 3 screw driver tips.....	1.25
Extra Screw Driver Tips, per set of 3, 25c; each.....	.10
Extra Brad Awls, per set of 3, 25c; each.....	.10
Extra Spring Fingers.....	.50

Sent complete unless otherwise ordered.

Stair Gauge Fixtures

No. 111



A pair of these fixtures can be readily clamped to a carpenter's steel square to form a gauge for various uses.

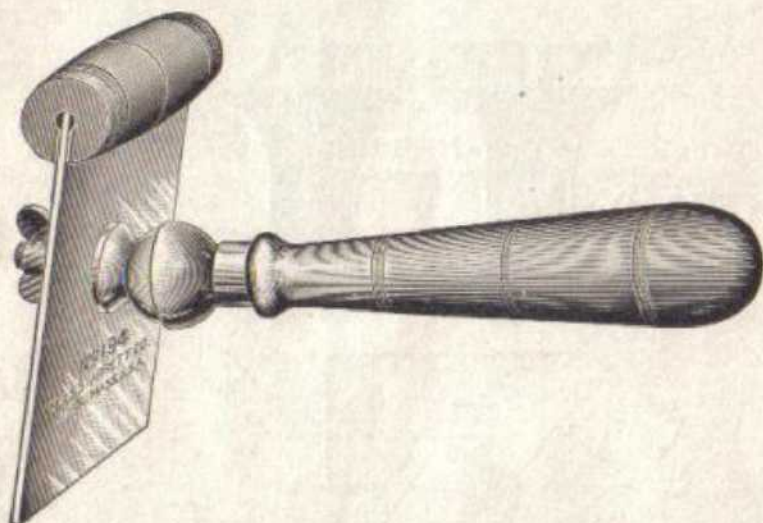
Sketch A shows the gauge as applied for laying out a stair stringer; sketch B, laying off hexagon angles; sketch C, as used as a center gauge or in quartering a circle.

These fixtures are light, neat, efficient, and low priced.

Price, per pair.....\$0.75.

Universal Scraper

No. 194



This scraper has all edges ground perfectly square, which by using both sides gives it eight sharp cutting edges, any one of which can almost instantly be brought into use by means of the ball joint connecting handle. By a slight turn of same the ball joint is frictionally locked or released, or placed at any angle desired to get into corners and to tip the scraper blade so as to give the most effective cut. The head piece, which may be instantly slipped off and on either end or side of the scraper, together with the finely shaped handle, enables one to use it with a strong, firm grip, bearing on either heavily or lightly to effect the best results. In fact it is the neatest and best scraper in its line ever made, for use on floors, benches, meat blocks, etc.

PRICE, each.....\$0.75

Time Saver Drill, Tap, and Steel Wire Gauge

No. 185

TIME O SAVER DRILL & TAP DRILL GAUGE CHART FOR MACHINE SCREW TAPS THE L. S. STARRETT CO. ATHOL, MASS. U.S.A.				
SIZE OF TAP	TAP DRILL	BODY DRILL	DECIMAL EQUIVALENTS	
14X20 10	1	2	1.00	1.00
14X24 6 1/4	1	2	1.00	1.00
12X24 15	1	2	1.00	1.00
11X24 19	3	2	1.00	1.00
10X24 23	9	2	1.00	1.00
10X32 20	9	2	1.00	1.00
9X32 24 13	1	2	1.00	1.00
8X32 28 18	1	2	1.00	1.00
7X32 30 22	1	2	1.00	1.00
6X32 33 27	1	2	1.00	1.00
5X40 36 29	1	2	1.00	1.00
4X36 41 31	1	2	1.00	1.00
3X48 44 37	1	2	1.00	1.00
2X56 48 42	1	2	1.00	1.00
STEEL WIRE GAUGE				

By the use of this gauge one is enabled to select at once the right sized drill to suit machine screw tap most commonly used, leaving just stock enough for the tap to cut as near a full thread as is practicable for one tap without breaking it, thus saving much time and uncertainty of result attending the former crude ways of making a selection.

Explaining the chart, the first row of figures, for an example, read thus, 14x20 10 1/4. The number 14 (in the first row of figures) means the number or size of tap; 20 the pitch or size of thread; 10 the size of drill to use which will leave the right stock for proper thread; and 1/4, size of drill to use to let this tap or screw through outside of the thread.

The figures—1, etc., up to 60—designate the number of drill (size agreeing with the holes). Other figures, 228, 221, etc., designate the size of hole in thousandths of an inch.

PRICE\$1.75

Drill and Steel Wire Gauge

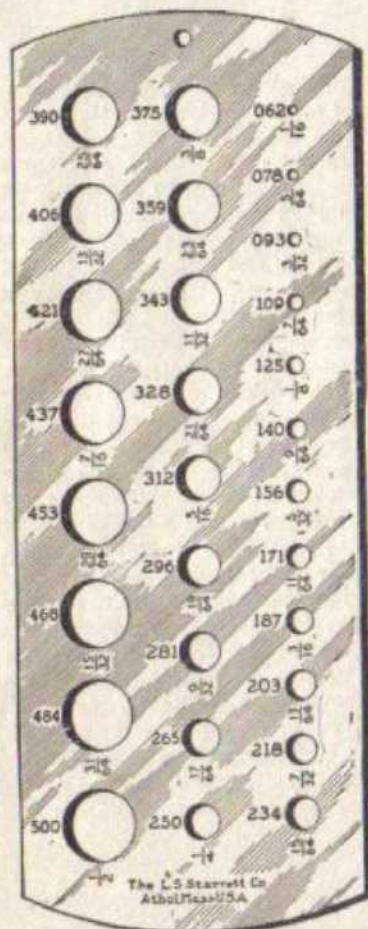
No. 186

This gauge gives the number of drill to fit each hole, and the size of the hole in thousandths of an inch.

PRICE.....\$1.50

Jobbers' Drill Gauge

No. 187

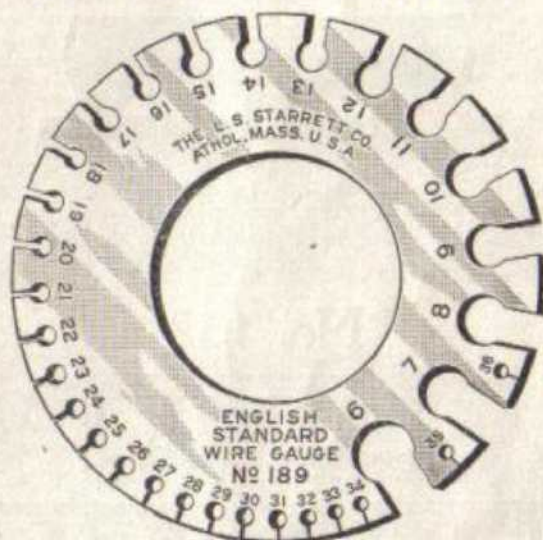


For Gauging Twist Drills

This gauge shows sizes from $\frac{1}{8}$ in. to $\frac{1}{2}$ in., varying by 64ths. Each size is designated by both common and decimal fractions. The gauge is hardened and tempered and the holes standard.

PRICE, No. 187\$2.25

English Standard Wire Gauges No. 188 and No. 189



Sizes of the Numbers of English Standard Wire Gauge Each gauge tested after hardening

No. of Wire Gauge.	Size of Each No. in Decimal Parts of an Inch.	No. of Wire Gauge.	Size of Each No. in Decimal Parts of an Inch.	No. of Wire Gauge.	Size of Each No. in Decimal Parts of an Inch.
0000	.454	11	.120	25	.020
000	.425	12	.109	26	.018
00	.390	13	.096	27	.016
0	.340	14	.083	28	.014
1	.300	15	.072	29	.013
2	.284	16	.065	30	.012
3	.259	17	.058	31	.010
4	.238	18	.049	32	.009
5	.220	19	.042	33	.008
6	.203	20	.035	34	.007
7	.180	21	.032	35	.005
8	.165	22	.028	36	.004
9	.148	23	.025		
10	.134	24	.022		

PRICES

No. 188 takes in 1 to 35.....	\$2.00
No. 189 " 6 to 36.....	1.50

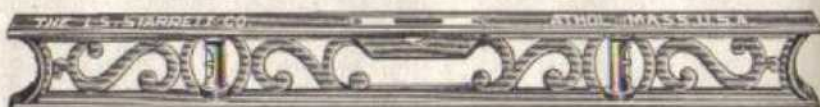
Iron Levels No. 130



Bench Level

PRICE, $3\frac{1}{4}$ inch\$0.30

No. 132



Bench Levels with Double Plumbs

PRICES

4 inch, with square ends.....	\$1.35	12 inch, with square ends.....	\$1.75
6 " " " "	1.50	18 inch, as in bottom cut.....	2.00
9 " " " "	1.65	24 " " " "	2.25



Our levels, Nos. 96, 96, 97, 98, 132, 133, 197 and 198, have longitudinal grooves in seat of base, as shown in small cut, adapting them to set on cylindrical work, piping, shafting, etc., and also improving them for flat work. This concave groove is a section of about 1 inch circle and is perfectly true in relation to the base. The outer edges of the concave only touch the surface of a round, unless it be less than 1 inch diameter, and is an improvement over a deep V groove, being, as we make them, absolutely accurate, and doing away with a clumsy base.

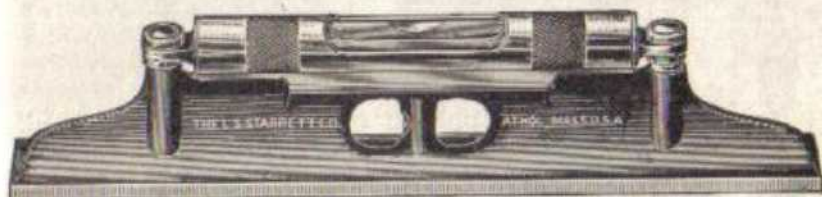
Adjustable Bench Levels

With ground and graduated vials,—accurate and very sensitive.

These levels are so constructed that they can be accurately adjusted, and when so adjusted are not liable to get out of truth, theials being set in tubes having solid ends which are firmly clamped to the base. The tubes are nickel plated, the bases japanned or nickel plated. The outer tube may be turned so as to protect the glass when not in use. These levels have the longitudinal groove mentioned on the preceding page.



4 in., 6 in., and 8 in. sizes.



12 in. size. The 18 in. is similar, but with double plumb.

No. 95

Pucks

4	inch,	with	Plain	Vial.....	\$1.00
6	"	"	"	".....	1.25
8	"	"	"	".....	1.50
12	"	"	"	".....	2.00
18	"	"	"	".....	3.00

Either size, nickel base, 25 cents extra.

No. 96

PRICES

4	inch, with Ground and Graduated Vial.....	\$2.50
6	.....	3.50
8	.....	4.00
12	..... with plumb.....	5.50
18	..... with double plumb.....	8.00

Either size, nickel base, 25 cents extra.

The bottoms of these levels are all ground true.

Electrician's Level

Un-Magnetic



This level is especially designed for use about electrical works, setting up electrical engines, dynamos, etc., or in any place where an iron or steel level is liable to be magnetized. The base is made of bronze, is un-magnetic and has concave groove in the bottom, running through the center full length, adapting it to rest on a shaft or pipe as well as on a flat surface. The No. 197 has a plain vial, and the No. 198 a ground and graduated vial, each set in an adjustable brass tube, having around it an outer tube which may be turned to cover and protect the glass when not in use.

No. 197

PRICES

8 inch, with plain vial.....	\$2.50
12 " " " "	3.50
16 " " " "	4.50

In fancy wooden case.....\$1.00 extra.

No. 198

PRICES

8 inch, with ground and graduated vial.....	\$4.50
12 " " " "	6.00
16 " " " "	8.00

In fancy wooden case.....\$1.00 extra.

Both numbers sent without case unless otherwise ordered.

Nickel Plated Pocket Levels

No. 135



PRICES

2½ inch.....	\$0.40	3½ inch.....	\$0.50
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Engineers' and Plumbers' Levels

No. 133



The above represents an adjustable, incline level, a fixed level, and a plumb. The hinged tube inside the working faces of the frame, carrying a level glass, is adjustable to the graduated scale, and shows any incline by 32ds (or less) to 2 inches to the foot without interfering in the least with the plumb or level.

A longitudinal groove in seat of frame (not shown in cut) adapts it to rest on a cylindrical shaft or pipe as well as on flat surfaces, making it convenient to determine the pitch of drain pipes, etc.

These instruments are supplied with either ground or plain glasses.

PRICES

10 inch.....	with plain glasses, \$2.75;	with ground glasses, \$5.75
15 "	" " " 3.00;	" " " 6.00

Cross-Test Level and Plumb

No. 134

Nickel Plated



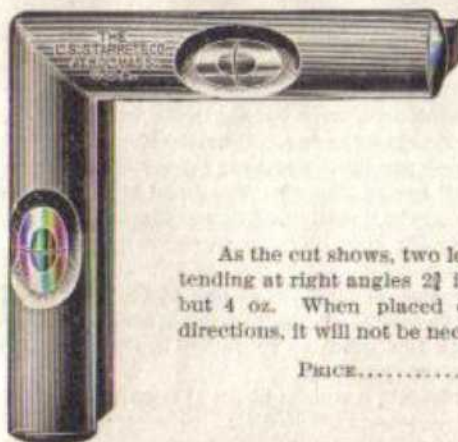
This is a well made and reliable tool, and valuable in plumbing, squaring, and leveling up work. Just the thing to use about a planer or in setting up machinery. Leveling is indicated every way without moving the tool.

It weighs three ounces. Size 2 inch x 3 inch x $\frac{1}{2}$ inch thick. Can be easily carried in the pocket.

PRICE.....\$1.50

Cross-Test Level

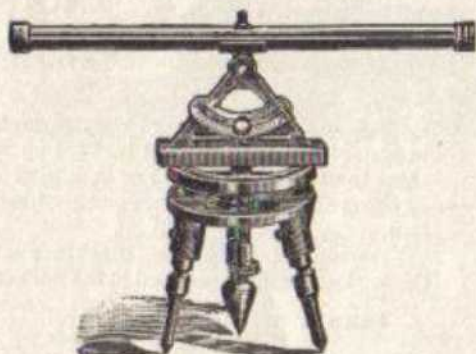
No. 136



As the cut shows, two levels are united in one frame, extending at right angles $2\frac{1}{2}$ in. each way. The level weighs but 4 oz. When placed on work to be leveled in both directions, it will not be necessary to move the tool.

PRICE.....\$0.65

Transit No. 99



This instrument is designed especially to meet the wants of architects, carpenters, masons, millwrights, contractors, and builders, who in their work often require the use of a level and some instrument for the taking of angles, but do not feel like paying the price of a surveyor's or engineer's transit.

The instrument is composed of iron and brass, and consists of a tripod, to the head of which is connected by a ball-and-socket joint an upper plate, which can be leveled by the leveling screws.

This plate is recessed to contain a graduated arc for taking angles. On this plate rests a triangular frame to which are attached a level, a graduated arc for taking vertical angles, and a sight tube. The plain sight tube has no lenses, is brass, twelve inches long: in one end is a small eye aperture, in the other the usual cross wires.

The telescope has cross lines, is adjustable to distances, and is same size and length as plain sight tube.

With short legs, as shown in the cut, the instrument is eight inches high. With long extension legs, which fasten on over the short, the height can be from two feet eight inches to four feet eight inches. The sight tube, level case, and graduated arcs are nickel plated, the other parts are japanned.

The advantages of this transit are as follows: The head is held to the tripod with a bolt and nut, so as to make it stationary at any given point; the graduated arc can be clamped to the base-plate by throwing a small cam arrangement.

All points taken into consideration, this transit is one of the best of its kind in the market. It is adapted to almost all kinds of work, and is made of the best of materials, and finished and adjusted by skilled workmen. It is warranted perfect and accurate in every respect.

When packed and ready for shipment it weighs about 15 pounds.
For PRICES, see next page.

(Transit, No. 99.)

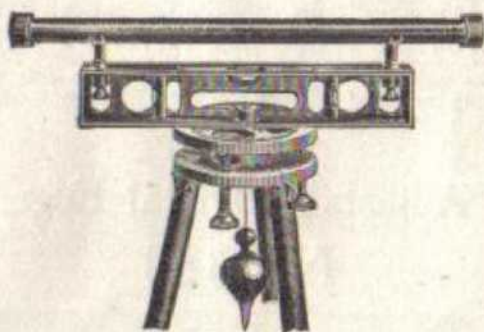
PRICES

With plain sight tube and long legs.....	\$16.50
" " " " " short legs.....	15.00
" " " " " long legs and ground level vial.....	18.00
" " " " " short legs " " " " ".....	16.50
" telescope, long legs, and ground level vial.....	28.00
" " short " " " " " " " " ".....	26.50

Target to go on common ten-foot pole, extra \$1.50.

Leveling Instrument

No. 101



Warranted to be true in every respect.

The best, the cheapest and most durable in the market for the money.

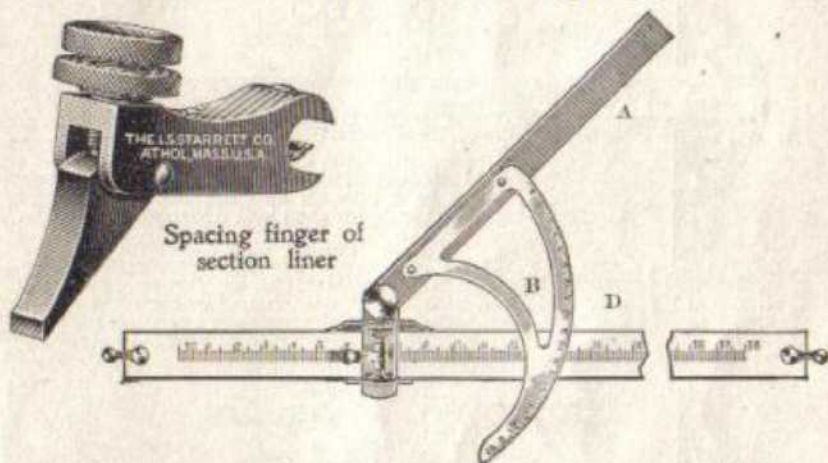
It is adapted for the use of architects, carpenters, builders, stone masons, and others, for leveling, getting angles, etc.

It is made of iron, japanned, except the sight tube, which is of brass, nickel plated. It weighs, when packed in box for shipment, 13½ pounds. Directions sent with instrument.

PRICES

Japanned, nickeled tube.....	\$12.50
" " " with ground vial in level.....	14.00

Section Liner and Protractor



The lower illustration shows our No. 165 Section Liner (A) with our No. 165 Protractor (B) attached, as applied to our No. 167 Graduated Straight Edge (D) described on the preceding page.

Section Liner No. 165

The section liner can be set at any angle, either way, and the joint locked by a slight turn of the knurled disc. By thumb pressure on the button-headed screw, which may be adjusted to a fine or coarse movement, hatching may be rapidly and evenly done, and for accurately spacing work for draughting to the scale of $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$ to foot, the device is a great convenience. Pressing the button two or more times, any desired distance can be quickly and evenly spaced off, and with the assurance that no mistake is made, as is liable when other means are employed.

When ordering section liner alone, the width should be given of the T square blade or straight edge which the section liner is to fit.

PRICES		
15 inch, \$5.00	24 inch, \$6.00	36 inch, \$7.00

Protractor No. 165 $\frac{1}{2}$

This protractor is $\frac{1}{2}$ of a 14 inch circle, and is graduated as fine as quarter-degrees. This, by steady pins, accurately fits (either side up) the jointed arm of No. 165 Section Liner.

PRICE, each.....	\$5.00
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Draughtsmen's T Square No. 163



The heads are made of aluminum, 10 inches long, weighing only from 4 to 6 ounces, and the blades of spring-tempered steel, all nicely finished and warranted accurate.

PRICES

20 inch blade, 1 inch wide, $\frac{3}{4}$ inch thick	\$3.00
24 " " " 1 " " " $\frac{3}{4}$ " " "	3.50
36 " " " 1 $\frac{1}{2}$ " " " $\frac{3}{4}$ " " "	5.00
48 " " " 1 $\frac{1}{2}$ " " " $\frac{3}{4}$ " " "	6.50

Improved T Square No. 164



Graduated or Plain

Cut No. 164 represents a nickel plated T square, with spring-tempered blade and aluminum head, weighing only about five ounces, and has an automatic clamping device to hold it by spring pressure against a metal straight edge attached to the end, or end and side, of a draughting board or table (see description of Metal Edge, No. 168), or by a slight turn of knurled nut, locked firm. The top side of the blade graduated forms a scale to set dividers, etc., and a feed rack, for section liner to work on.

PRICES

22x1 $\frac{1}{2}$ inch blade, 10-inch head, not graduated, \$3.50, graduated, \$4.25	
26x1 " " " 10 " " " " 4.25 " 5.00	
32x1 " " " 10 " " " " 5.00 " 6.00	
36x1 " " " 13 " " " " 5.75 " 7.00	
42x1 " " " 13 " " " " 6.50 " 8.00	
48x1 " " " 13 " " " " 7.50 " 9.50	

Those graduated will be sent unless otherwise ordered.

No. 164M

The same as No. 164, except that the blades are graduated in millimeters.

PRICES

60 cm.	\$4.50
80 " "	6.00
1 meter.	8.00

Principal Standards for Wire Gauge

Used in the United States

Dimensions of Sizes in Decimal Parts of an Inch

Number of Wire Gauge.	American, or Brown & Sharpe.	Birmingham, or Stubs'.	Washburn & Moen Mfg. Co.	Number of Wire Gauge.
000000	.....	.....	.46	000000
00000	.....	.....	.43	00000
0000	.46	.454	.393	0000
000	.40064	.425	.362	000
00	.3648	.38	.331	00
0	.32486	.34	.307	0
1	.2893	.3	.283	1
2	.25763	.284	.263	2
3	.22942	.259	.244	3
4	.20431	.238	.225	4
5	.18194	.22	.207	5
6	.16202	.203	.192	6
7	.14428	.18	.177	7
8	.12849	.165	.162	8
9	.11443	.148	.148	9
10	.10189	.134	.135	10
11	.090742	.12	.12	11
12	.080808	.109	.105	12
13	.071961	.095	.092	13
14	.064084	.083	.08	14
15	.057068	.072	.072	15
16	.05082	.065	.063	16
17	.045257	.058	.054	17
18	.040303	.049	.047	18
19	.03589	.042	.041	19
20	.031961	.035	.035	20
21	.028462	.032	.032	21
22	.025347	.028	.028	22
23	.022571	.025	.025	23
24	.0201	.022	.023	24
25	.0179	.02	.02	25
26	.01594	.018	.018	26
27	.014195	.016	.017	27
28	.012641	.014	.016	28
29	.011257	.013	.015	29
30	.010025	.012	.014	30
31	.008928	.01	.0135	31
32	.00795	.009	.013	32
33	.00708	.008	.011	33
34	.006304	.007	.01	34
35	.005614	.005	.0095	35
36	.005	.004	.009	36
37	.004453	.....	.0085	37
38	.003965	.....	.008	38
39	.003531	.....	.0075	39
40	.003144	.....	.007	40

Tapers and Angles

Taper Per Foot.	Included. ◁		With Center Line. —		Taper Per Inch.	Taper Per Inch from Center Line.
	Deg.	Min.	Deg.	Min.		
$\frac{1}{8}$	0	36	0	18	.010416	.005203
$\frac{1}{16}$	0	54	0	27	.015625	.007812
$\frac{1}{4}$	1	12	0	36	.020833	.010416
$\frac{3}{16}$	1	30	0	45	.026042	.013021
$\frac{1}{2}$	1	47	0	53	.031250	.015625
$\frac{5}{16}$	2	05	1	02	.036458	.018229
$\frac{3}{4}$	2	23	1	11	.041667	.020833
$\frac{7}{8}$	2	42	1	21	.046875	.023438
$1\frac{1}{8}$	3	00	1	30	.052084	.026042
$1\frac{1}{4}$	3	18	1	39	.057292	.028646
$1\frac{3}{8}$	3	25	1	47	.062500	.031250
$1\frac{1}{2}$	3	52	1	56	.067708	.033854
$1\frac{5}{8}$	4	12	2	06	.072917	.036456
$1\frac{7}{8}$	4	28	2	14	.078125	.039063
2	4	45	2	23	.083333	.041667
$2\frac{1}{8}$	5	58	2	59	.104666	.052084
$2\frac{1}{4}$	7	08	3	34	.125000	.062500
$2\frac{3}{8}$	8	20	4	10	.145833	.072917
3	9	32	4	46	.166666	.083333
$3\frac{1}{8}$	11	54	5	57	.208333	.104166
$3\frac{1}{4}$	14	16	7	08	.250000	.125000
$3\frac{3}{8}$	16	36	8	18	.291666	.145833
4	18	54	9	27	.333333	.166666
$4\frac{1}{8}$	21	40	10	50	.375000	.187500
5	24	04	12	02	.416666	.208333
6	28	06	14	03	.500000	.250000

Melting Points

Cast Iron	2210 deg. Fahr.
Wrought Iron.....	2912 " "
Steel.....	2500 " "
Copper.....	2160 " "
Brass.....	1900 " "
Lead.....	608 " "
Tin.....	446 " "

Table

Giving Proportionate Weight of Castings to Weight of Wood Patterns

A Pattern Weighing One Pound Made of (Less weight of Core Prints).	Cast Iron.	Brass.	Copper.	Bronze.	Bell Metal.	Zinc.
Pine or Fir.....	16	15.8	16.7	16.3	17.1	13.5
Oak.....	9	10.1	10.4	10.3	10.9	8.6
Beech.....	9.7	10.9	11.4	11.3	11.9	9.1
Linden.....	13.4	15.1	16.7	15.5	16.3	12.9
Pear.....	10.2	11.5	11.9	11.8	12.4	9.8
Birch.....	10.6	11.9	12.3	12.2	12.9	10.2
Alder.....	12.8	14.3	14.9	14.7	15.5	12.2
Mahogany.....	11.7	13.2	13.7	13.5	14.2	11.2
Brass.....	0.85	0.95	0.99	0.98	1.0	0.81

Letter Sizes of Drills

Diameter Inches.	Decimals of 1 Inch.	Diameter Inches.	Decimals of 1 Inch.
A $\frac{1}{16}$	.234	N $\frac{5}{16}$	.302
B $\frac{1}{8}$	.238	O $\frac{3}{8}$	.316
C $\frac{3}{16}$	.242	P $\frac{7}{16}$	.323
D $\frac{1}{4}$	.246	Q $\frac{1}{2}$	.332
E $\frac{5}{16}$	.250	R $\frac{9}{16}$	.339
F $\frac{3}{8}$	.257	S $\frac{5}{8}$	.348
G $\frac{7}{16}$	.261	T $\frac{3}{4}$	.358
H $\frac{1}{2}$	.266	U $\frac{7}{8}$	.368
I $\frac{5}{8}$	.272	V $\frac{15}{16}$	.377
J $\frac{3}{4}$	.277	W $\frac{1}{2}$	.386
K $\frac{7}{8}$	.281	X $\frac{1}{2}$	.397
L $\frac{15}{16}$	.290	Y $\frac{1}{2}$	.404
M $\frac{1}{2}$	.295	Z $\frac{1}{2}$	.413

Table of Sizes of Tap Drills

Tap Diameter.	Threads per inch.	Drill for V Thread.	Drill for U. S. Standard.	Drill for Whitworth.
$\frac{1}{16}$	16, 18, 20	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$
$\frac{1}{8}$	16, 18, 20	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{3}{16}$	16, 18	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{1}{4}$	16, 18	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{5}{16}$	14, 16, 18	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{3}{8}$	14, 16, 18	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{7}{16}$	14, 16	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{1}{2}$	14, 16	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{9}{16}$	12, 13, 14	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{5}{8}$	12, 14	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{3}{4}$	10, 11, 12	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{7}{8}$	11, 12	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{15}{16}$	10, 11, 12	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
1	10	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
	9, 10	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
	9	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
	8	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$

Double Depth of V and U. S. Standard Threads

Threads per in.	U.S. Standard DD.	V Thread DD.	Threads per in.	U.S. Standard DD.	V Thread DD.
64	.02029	.02706	16	.08118	.10825
60	.02165	.02887	14	.09278	.12357
56	.02319	.03093	13	.09992	.13323
50	.02598	.03464	12	.10825	.14433
48	.02706	.03608	11	.11809	.15745
44	.02952	.03936	10	.12990	.17320
40	.03247	.04330	9	.14433	.19244
36	.03608	.04811	8	.16237	.21650
32	.04059	.05412	7	.18555	.24742
30	.04330	.05773	6	.21650	.28866
28	.04639	.06185	5½	.23618	.31490
26	.04996	.06661	5	.25980	.34650
24	.05412	.07216	4½	.28866	.38488
22	.05904	.07872	4	.32475	.43300
20	.06495	.08660	3½	.37114	.49485
18	.07216	.09622	3	.43333	.57733

C—Double Depth of Thread.

D—Outside Diameter.

d—Diameter at Bottom of Thread.

Example

Showing the use of the above table. Find actual diameter at bottom of V thread, $\frac{1}{4}$ inch diameter, 10 threads to the inch. In the V thread column opposite the 10 threads per inch, find the decimal .173 inches; this subtracted from outside diameter of thread is the diameter at bottom of thread, thus:

	D	C	d
$\frac{1}{4}$ inch.....	.750 in.	.173 in.	.577 in.

The Metric System of Measurement

Measures of Length

1 Millimeter (mm.) =	.....0.03937079 inch, or about $\frac{1}{25}$ inch
10 Millimeters = 1 Centimeter (cm.) =	.....0.3937079 "
10 Centimeters = 1 Decimeter (dm.) =	.....3.937079 "
10 Decimeters = 1 meter (m.) =	.....39.37079 inches, 3.2808992 feet, or 1.09361 yards
10 Meters = 1 Dekameter (Dm.) =	.....32.808992 feet
10 Dekameters = 1 Hektometer (Hm.) =	.....19.927817 rods
10 Hektometers = 1 Kilometer (Km.) =	.....1093.61 yards, or 0.6213824 mile
10 Kilometers = 1 Myriameter (Mm.) =	.....6.213824 miles
1 inch = 2.54 cm., 1 foot = 0.3048 m., 1 yard = 0.9144 m., 1 rod = 0.5029 Dm., 1 mile = 1.6093 Km.	

Measures of Weight

1 Gramme (g.) =	15.4324874 gr. Troy, or 0.03215 oz. Troy, or 0.03527398 oz. avoird.
10 Grammes = 1 Dekagramme (Dg.) =	.....0.3527398 " "
10 Dekagrammes = 1 Hectogramme (Hg.) =	.....3.527398 " "
10 Hectogrammes = 1 Kilogramme (Kg.) =	.....2.20462125 lbs.
1000 Kilogrammes = 1 Tonne (T.) =	2204.62125 lbs., or 1.1023 tons of 2000 lbs., or 0.9842 ton of 2240 lbs., or 19.68 cwt.
1 grain = 0.0648 g., 1 oz. avoird. = 28.35 g., 1 lb. = 0.4536 Kg., 1 ton 2000 lbs. = 0.9072 T., 1 ton 2240 lbs. = 1.016 T., or 1016 Kg.	

Measures of Capacity

1 Liter (l.) = 1 cubic decimeter =	61.0270515 cubic in., or 0.03531 cu. ft., or 1.0567 liquid qts., or 0.908 dry qt., or 0.26417 Amer. gal.
10 Liters = 1 Dekaliter (Dl.) =	2.6417 gal., or 1.135 pk.
10 Dekaliters = 1 Hektoliter (Hl.) =	2.8375 bu.
10 Hektoliters = 1 Kiloliter (Kl.) =	61027.0515 cu. in., or 28.375 bu.
1 cu. foot = 28.317 l., 1 gallon, Amer. = 3.785 l., 1 gallon, Brit. = 4.543 l.	

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New York Store,
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Chicago Store,
15 South Canal St.

We carry a full stock of our tools at both our New York and Chicago stores. Orders may be sent to us at Athol, New York, or Chicago, as best suits the convenience of the purchaser.

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Japan.

YOKOHAMA, F. W. Horne, Box 174.

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A Supplement to
Catalogue No. 17

THE L. S. STARRETT CO.

Athol, Mass., U. S. A.



Mechanics' Badges

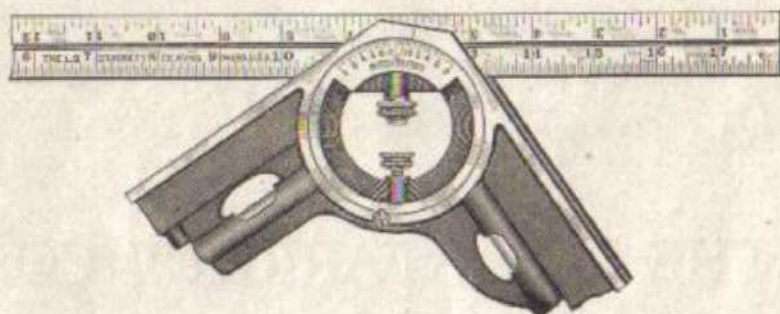
Pin or Watch Charm. Made of hard white metal, not plated, and will not tarnish. Size as shown in the engravings. When so ordered they will be sent mounted on easel display cards, one dozen on a card.



Price, Pin or Charm, - \$0.15.

Patent Protractor

No. 16



This protractor blade closes in the stock either way against a stop, making a perfect square, plumb, and level. With a 24 inch blade it weighs but 1 $\frac{3}{4}$ pounds. The turret is graduated on both sides, one in degrees, the other to show pitch to the foot, so that the blade may be set by the graduation for laying off angles to any degree or any pitch, and the opposite branch of the stock will be right to lay out the complementary angle without mental calculation or error, for valley roofs, bridge work, stair gauges, etc. The levels are so arranged that work can be leveled up to any degree or pitch underneath or on top of a roof, rafter, stair stringer, etc.

As a square or protractor with the sliding blade it can be used in places where a fixed blade could not and is a substitute for a whole kit of squares from the shortest to the full length of blade, making a depth gauge for squaring in mortises and transferring measurements. It may be used in place of the carpenter's old time steel square with the advantage of being packed in a chest without taking up so much room.

Without the blade the stock may be used in contracted places as a 6 inch level and plumb, while with an 18 or 24 inch blade, a level and plumb of corresponding length is obtained. Altogether this tool makes a kit that will be appreciated by every progressive mechanic.

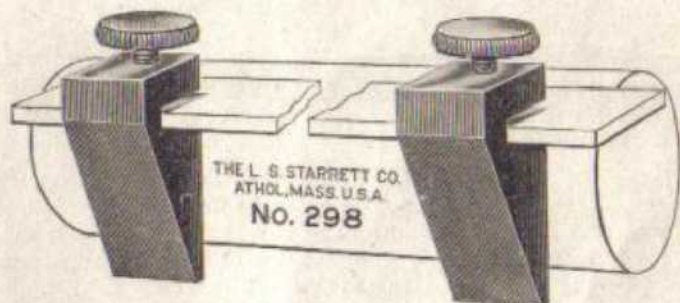
Prices

With 24 inch blade	\$6.00
" 18 " "	5.50
" 12 " "	4.75
Stock only	3.50

The 12 inch, 18 inch, and 24 inch blades of our combination squares will fit the protractor stock, but the 18 inch and 24 inch lengths are best adapted for this tool.

Key Seat Clamps

No. 298



Designed to transform any common steel scale into a Key Seat Rule.

They are made from steel, case hardened, and ground accurate.

A pair weighs but one ounce. They can be put on or off almost instantly, and are a complete substitute for a more costly tool.

They may be used with our Combination Square blades, or with any straight rule, with accurate results.

PRICE

Per pair\$0.60

Tap Wrench

No. 174



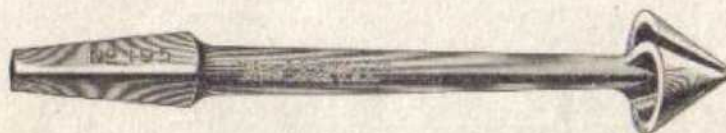
This little tool is made of steel, nicely finished, and will hold any tool that can be put into it,—taps, reamers, drills, etc. It holds tools of any shape, round, square, or oval.

PRICE

3 inches long\$0.50

Double-Lip Countersink

No. 195



This is the only double-lip, self-centering wood countersink that has a keen cutting edge, and the only one made on the true principle for a wood-working tool. It will clear itself of its shavings in any kind of wood and will cut a smooth, round hole. It is made from the best of steel, forged, twisted, and tempered. It can be sharpened from the inside with a file.

PRICES

$\frac{1}{2}$ inch.....	\$0.35
$\frac{3}{8}$ " .....	.40

New Desk Rule

No. 367



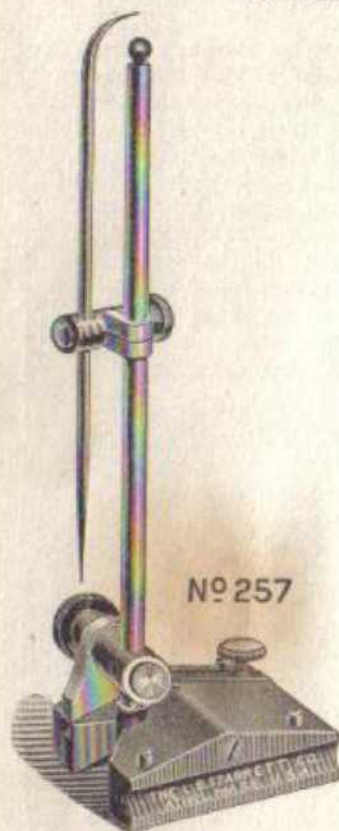
This shows our heavy, nickel-plated desk rule and straight edge, beveled and graduated in 16ths of an inch. For convenience in picking up, a knob is secured to its side. This rule makes an excellent paper weight and its beveled edge a fine paper cutter.

PRICES

8 inch long, 1 inch wide, $\frac{3}{16}$ inch thick.....	\$0.50
9 " " 1 " " $\frac{1}{8}$ " " .....	.60
12 " " 1 " " $\frac{1}{8}$ " " .....	.75

New Universal Surface Gauge No. 257

With Case Hardened Steel Base



This gauge has our latest improvements, which make it all that can be desired, the following being points of special merit:

It has a heavy base, grooved through the bottom and end, adapting it for use on or against circular work as well as flat surfaces. The spindle passes through a rotating head, jointed to a rocking bracket, pivoted in base, the bracket being adjusted by a knurled screw in one end against a stiff spring in the other. The spindle may be set upright or at any angle, or turned so as to work under the base, and can be sensitively adjusted to any position. The snug and head carrying the scriber are so made that when the clamp nut is loosened all may be freely moved to any position, and by friction springs retained in place until a slight turn of the clamp nut holds them firmly.

In the base are four gauge pins, frictionally held, which may be pushed to bear against the edge of a surface plate, or in the slot of a planer bed for lineal work.

For small work the spindle may be removed and the scriber inserted in a hole provided for it, where it can be sensitively adjusted and used to advantage on bench work.

Special attention is called to the four gauge pins in the corners of the base, which adapt it to be used as a locomotive guide

liner and make it more convenient than other gauges for many uses.

An extra long spindle, which may be quickly substituted for the regular, will be sent with the gauge when ordered.

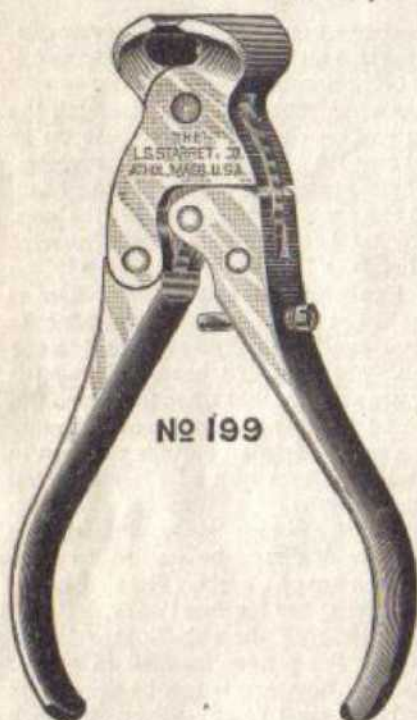
PRICES

No. 257A	3 inch base, with 9 inch spindle.....	\$3.00
No. 257B	3 " " " 9 and 12 inch spindles.....	3.35
No. 257C	3 1/2 " " " 12 inch spindle.....	3.50
No. 257D	3 1/2 " " " 12 and 18 inch spindles.....	4.00

Spindles only at 3 cents per inch.

Cut-Nipper No. 199

For Bicycle Spokes, etc.



No 199

This nipper combines great power with rigidity. Wire can be cut at either extreme end of the jaws.

The cutting jaws conform to the inside of a bicycle rim, and will cut off the spokes just as close as required.

All our nippers are tested before leaving the factory. All parts are interchangeable, so that in case a jaw breaks a new one can be obtained.

PRICES

5 inch.....	\$1.50
Jaws, per pair.....	1.00
Jaws, each .....	.50

In ordering extra jaws, specify as per cut which jaw is wanted.

Pocket Scriber No. 70

This tool is made from steel tubing, knurled and nickel plated. The scriber is made from the best quality of steel, nicely tempered, and is held by a knurled chuck. The scriber is reversible, telescoping into the stock, and is held by a slight turn of the chuck so that it is always as safe to carry in the pocket as a penknife.

Mechanics find this a convenient tool to have always with them.

PRICE.....\$0.25



Pocket Screw Drivers

No. 553



OPEN

This tool is made from steel tubing, knurled and nickel-plated. The butt of the blade fits a solid lock in the tube, preventing it from turning, and is held from coming out by a slight turn of the chuck.

To carry in pocket, reverse the blade, inserting it in the handle, giving a slight turn of the chuck to keep it there. It takes no more room in the pocket than a penknife.

The screw driver blades are properly tempered.



CLOSED

PRICES

No. 553A	Handle $\frac{1}{2}$ inch diameter, blade $2\frac{1}{2}$ inches long, weight $\frac{3}{4}$ oz.....	\$0.25
No. 553B	Handle $\frac{3}{4}$ inch diameter, blade 3 inches long, weight $1\frac{1}{4}$ oz.....	.35
Extra Blades, each.....		.10

Steel Shrink Rules

PRICES

12 inch.....	\$1.75	24 inch.....	\$3.50
No. 374	Shrink, $\frac{1}{16}$ to foot.	No. 4	graduation.
No. 379	" $\frac{1}{8}$ " "	No. 2	graduation.

Jewelers' Screw Drivers No. 555



They are nicely and substantially made from steel tubing, knurled and nickel plated. Five constitute a set, with blades varying from .040 inch to .100 inch size. The blades are held from turning in the handle by a solid lock, and from coming out by a slight turn of a neat chuck. The top is finished with a swivel knob, concaved to fit the finger and hexagonal in shape to prevent rolling off the bench. To designate the size at a glance, the chuck end is marked with various grooves, four grooves indicating the finest size A, three grooves the next larger B, two grooves C, one groove D, the largest size, E, being plain.

PRICES				
No. 555A	Handle $\frac{1}{4}$ in., diameter of blade	.040 in.	.....	\$0.35
No. 555B	" " " " "	.055 "	.....	.35
No. 555C	" " " " "	.070 "	.....	.35
No. 555D	" " " " "	.080 "	.....	.35
No. 555E	" " " " "	.100 "	.....	.35
Set of five	.....	\$1.60	Extra blades, each	.....\$0.10

Opticians' Screw Holder and Driver No. 552



This screw driver is designed for those using small screws, especially opticians, watch and clock makers. The body is made of $\frac{1}{8}$ inch steel tubing, having a swivel hexagonal head and a chuck to admit of interchangeable blades. The spring fingers are frictionally held to the screw driver blade and may be slipped off or on. Pressing the bowed part between the thumb and fingers opens the jaws to pick up by the head and hold the smallest screw. Drawing the holder back on the blade and rotating same the blade will enter the slot in screw, which, being held to the screw driver blade, may be placed and screwed home without danger of dropping or losing it. Screws may also be held and inserted in places where it would otherwise be difficult or impossible. When the screw holder is not needed it may be slipped back on the blade, out of the way.

PRICES

No. 552A	Complete Screw Driver, with two blades and screw holder.....	80.65
No. 552B	Screw Driver with two blades.....	.50
No. 552C	Screw Holder.....	.15
No. 552D	Extra Blades, each.....	.10

Sent complete unless otherwise ordered.

Steel Music Wire Gauge

No. 280

Cut full size.
Washburn & Moen
standard.

Each gauge carefully tested after hardening.

PRICE

No. 280 Takes in No. 12 to No. 28, \$1.50



Pin Vises No. 162

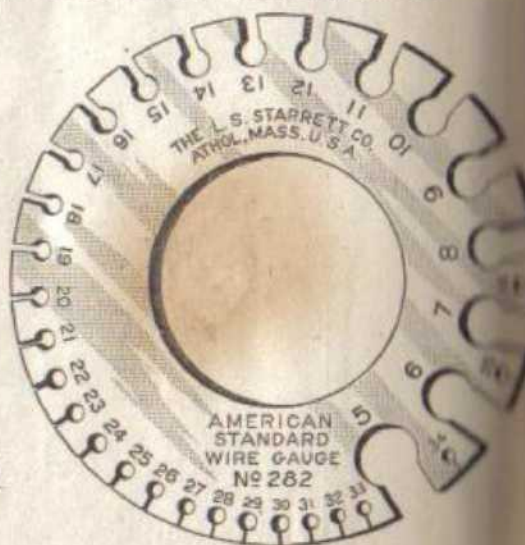


These vises have hardened jaws with chucks so made that they will hold firmly anything inserted in them. The hole extends through full length of the handle. The handle is reduced in size, so that it may be more rapidly rotated between thumb and finger when filing small work. They are convenient handles for holding scribers, small files, etc. Nickel plated.

PRICES

Capacity.

No. 162A	.0	inch to .040 inch	.....\$0.55
No. 162B	.090	" " .062	..... .55
No. 162C	.060	" " .125	..... .55
No. 162D	.115	" " .187	..... .75
Set complete (one of each size)..... 2.40			



American Standard Wire Gauges

No. 281 and No. 282

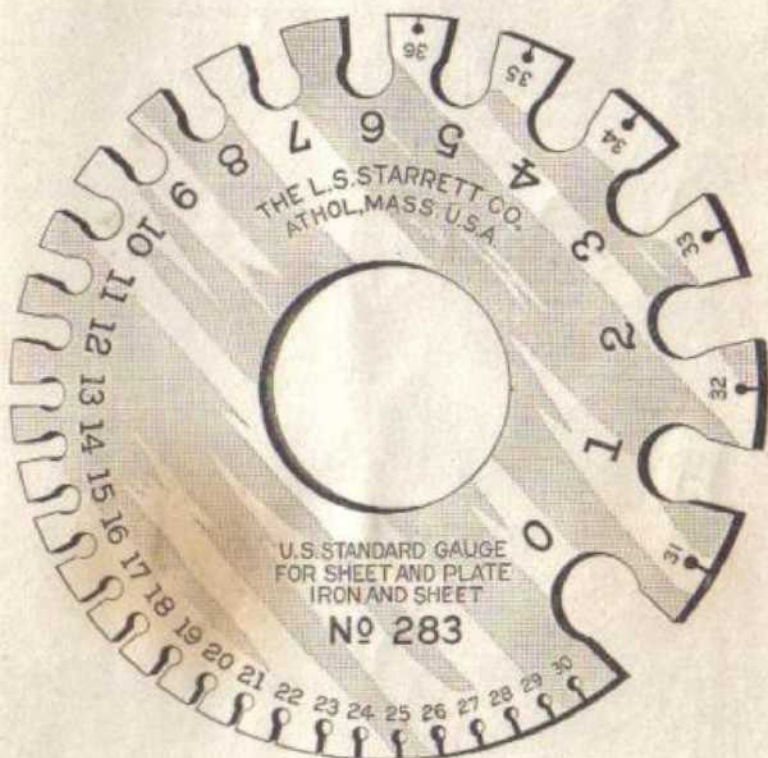
Each gauge is tested after hardening and warranted accurate.

PRICES

No. 281	takes in No. 0 to No. 36	.....\$2.50
No. 282	" " " 5 " " 36	..... 2.00

United States Standard Wire Gauge

No. 283



This gauge takes in sizes from No. 0 to No. 36. The gauge numbers are those of the U. S. Standard Gauge for sheet and plate iron and steel, adopted by Congress 3 March, 1893.

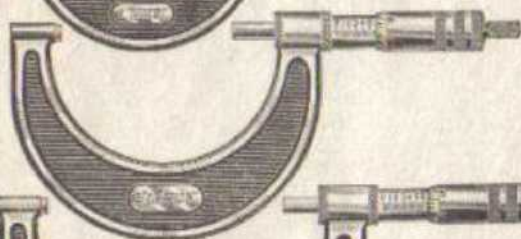
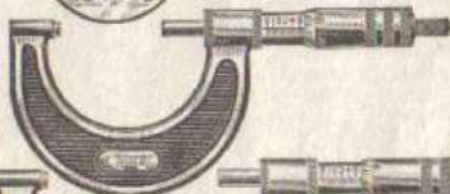
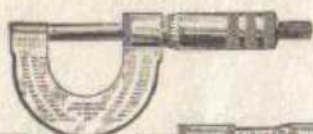
Size of gauge is approximately $3\frac{1}{4}$ inches in diameter by $\frac{1}{8}$ inch thick. Each gauge is carefully tested after hardening.

PRICE

No. 283 takes in No. 0 to No. 36.....\$2.50

New Micrometers

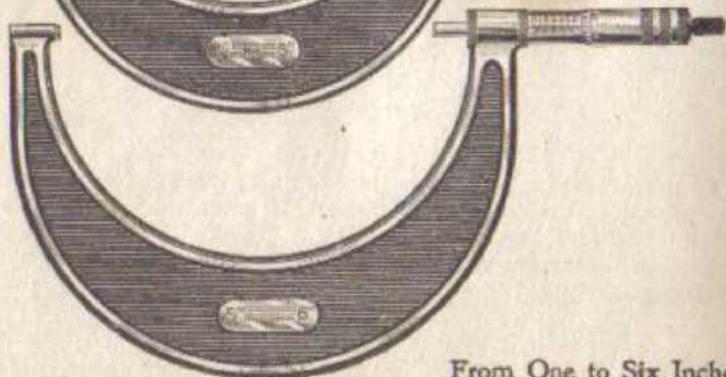
No. 226



No. 226



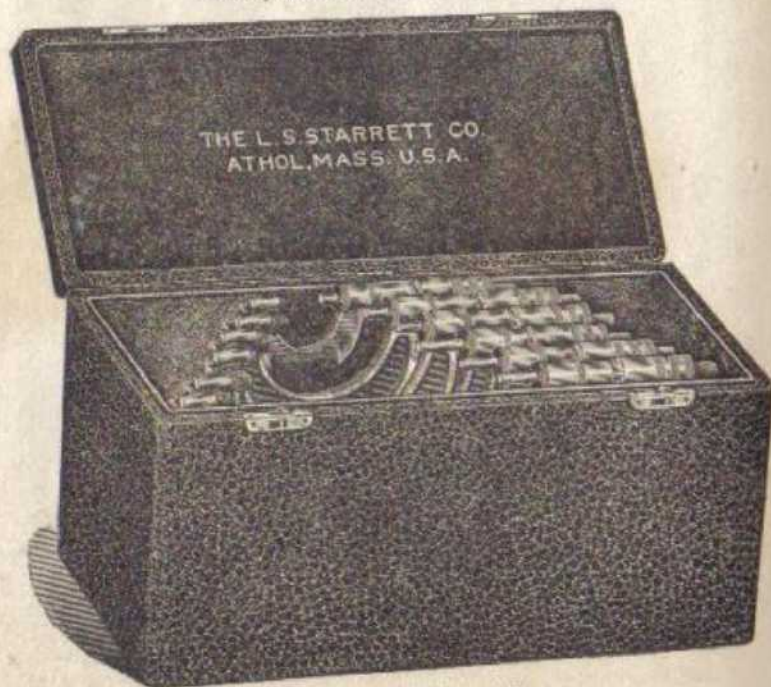
THE L.S.STARRETT CO.,
ATHOL, MASS., U.S.A.



From One to Six Inches.



Flat Case for Set of Three.

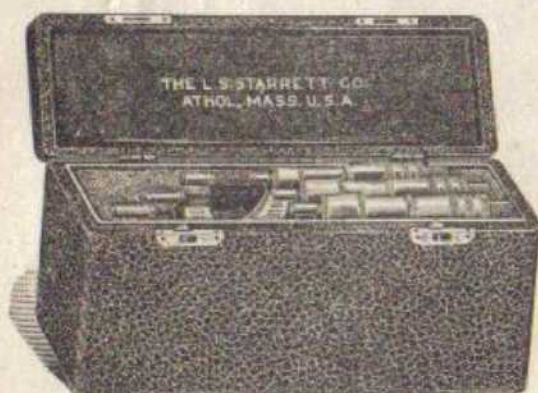


Upright Case for Set of Six.

Cases
for
Microm-
eters

No. 226

Cases for Micrometers No. 226.—Continued



Upright Case for Set of Three.

Cases Only

The cases for these micrometers are well made and nicely finished.

They are covered with morocco leather and lined with velvet.

For the set of three micrometers we can supply either a flat or upright case (see cuts), and for the set of six an upright case only.

PRICES FOR CASES ONLY	
For one inch only . . .	\$0.50
For set of three Micrometers, either upright or flat case . . .	2.00
For set of six Micrometers	4.00

Micrometers
No. 226M

Same as our No. 226 except that they are graduated for measurements by hundredths of a millimeter.

PRICES

0 to 25 mm.	
Without ratchet stop	\$5.50
With ratchet stop	\$6.00
25 to 50 mm.	
Without ratchet stop	\$4.50
With ratchet stop	\$5.00
50 to 75 mm.	
Without ratchet stop	\$6.00
With ratchet stop	\$6.50
75 to 100 mm.	
Without ratchet stop	\$6.50
With ratchet stop	\$7.00
100 to 125 mm.	
Without ratchet stop	\$7.25
With ratchet stop	\$7.75
125 to 150 mm.	
Without ratchet stop	\$8.00
With ratchet stop	\$8.50
Standard	
0 to 25 mm.	\$1.00
25 to 50 mm.	\$1.00
50 to 75 mm.	\$1.00
75 to 100 mm.	\$1.15
100 to 125 mm.	\$1.35
125 to 150 mm.	\$1.50

PRICES IN SETS

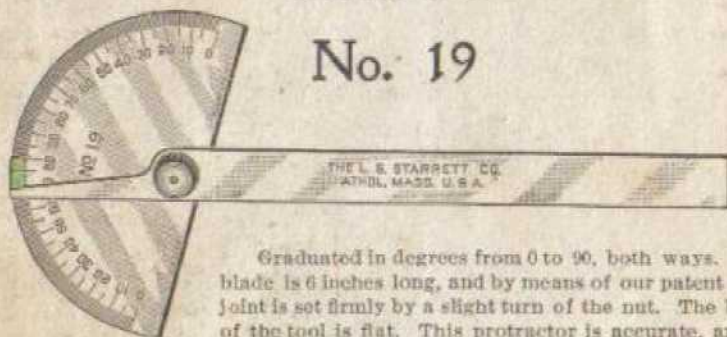
Set of three Micrometers from 0 to 75 mm.	
Without ratchet stop	\$15.50
With ratchet stop	\$17.00
Set of six Micrometers, including all sizes from 0 to 150 mm.	
Without ratchet stop	\$36.00
With ratchet stop	\$39.00

PRICES OF CASES ONLY

For size 0 to 25 mm.	\$0.50
For set of three Micrometers from 0 to 75 mm., either upright or flat case.	2.00
For set of six Micrometers from 0 to 150 mm.	4.00

Protractor

No. 19

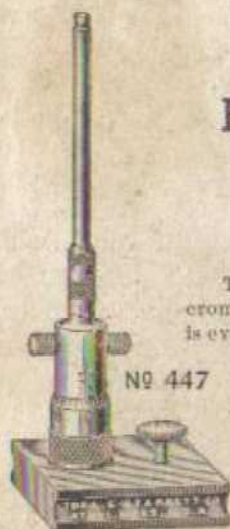


Graduated in degrees from 0 to 90, both ways. The blade is 6 inches long, and by means of our patent lock joint is set firmly by a slight turn of the nut. The back of the tool is flat. This protractor is accurate, and is convenient for setting bevels, for transferring angles, as a small T square, or for a large number of other uses which will readily occur to a machinist or draughtsman, and will be found reliable, and very satisfactory by any mechanic, especially those who do not care to pay for a more expensive tool.

PRICE.....\$1.50

Height Gauge Attachment

No. 447



This cut shows a steel base for holding our inside micrometer No. 124 for use as a height gauge. The anvil end is even with the bottom of the base and the micrometer is held perpendicularly, making a reliable gauge. A slight turn of the knurled screw instantly clamps it to or releases it from the base.

For Micrometer No. 124, see pages 76 and 77 of our Catalogue No. 17.

PRICE

Base only.....\$0.75

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